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THE I.C.I. MAGAZINE

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Front Cover: Young apprentices under instruction.

The Editor is glad to consider articles for publication.
Payment will be made for accepted contributions.

OUR CONTRIBUTORS

JOHN DOWLER has been a design engineer at Metals Division since 1948. Previously he studied engineering at Oxford until 1942, when he joined the Royal Navy, but he returned to his old university for research after his discharge in 1946. He attended the summer vacation course at the Massachusetts Institute of Technology in May 1949.

A. S. IRVINE, known to almost everybody as "Ivy," runs internal relations at Alkali Division and is the Magazine correspondent. He joined Alkali Division in 1934 and has remained there ever since, except for a break of four years as works manager at the ammonia-soda works at Khevrā in Pakistan. His hobbies, he tells us, "are dog-breeding, shooting, gardening, and drinking good wine at other people's expense—all directly connected with my chief hobby of good living in spite of Sir Stafford."

CEDRIC JAGGER, son of the famous sculptor, is a member of the African Department. He joined the Plastics Division Supply Department straight from school in 1938. During the war he spent six years in the Royal Artillery, serving for four years on self-propelled guns with the Eighth Army in Africa, Sicily and Italy. His hobbies are antiquarian horology, numismatics, crime stories and jazz music.

F. H. PERKINS, who had previously spent fourteen years in industry, joined the Company in 1946 to take up the newly created appointment of Education Officer. He came to us from the Ministry of Education. Here he had established a considerable reputation when, on loan to the Ministry of Labour, he supervised the starting up of the wartime scheme of Training Within Industry. This scheme, which has been widely adopted as a training for supervisors in industry, is based on the experience which Mr. Perkins had in the United States during a close study of American training methods in 1944.

DOROTHY THOMAS of Metals Division won many admirers with her article in the August issue. She writes again in the same vein with the same illustrator.



LOOKING back on memorable occasions in my own experience I can say, without doubt, that my first day as an apprentice in a large engineering works left more vivid and lasting impressions on my mind than almost any other day in my life. A completely new experience had arrived—away from school, away from home, in overalls, and at work among men. The occasion was all the more memorable as it represented an important step in the realisation of a schoolboy desire to become, one day, a railway engineer.

When thinking of those experiences, certain things stand out prominently in my mind: the first is the interview I had with the Works Manager at the outset. This came as a surprise; it only lasted two or three minutes, but it sufficed to impress upon me that, concerned as he was with some five thousand people, he had time to recognise the youngster starting as an apprentice in his works. He certainly had very definite ideas himself of what he expected of the newcomer. Another memory is of the interview in the Apprentice Supervisor's office, in which I was shown a wall chart illustrating the general plan of apprenticeship and the progress made by all the apprentices employed at that time. It was made quite clear to me that a plan existed and that progress depended upon results. The opportunity was there.

The first day's work brought me quickly down to the job. Within an hour or so of the preceding interviews I found myself starting work in one of the shops, in which I became the nipper in a gang of experienced tradesmen, who had clearly intended that the newcomer should be fully aware of his appointed place. Any superior airs aroused by the character of the high-level conversations earlier in the day were very quickly dispelled. For all these indelible first-day memories—

*Indenture Witnesseth That William Hickmott aged
 years and upwards son of John Hickmott of Berky in the County of Here-
 forshire, of his own free will, and in pursuance with the application and consent of his said father
 apprentice to Charles Barker the younger of Maidstone in the County of
 Kent. as a Stone Sawyer -
 and with him after the Manner of an Apprentice to serve from the Twentieth of March
 one eight hundred and eight, four*

By F. H. Perkins (I.C.I. Education Officer)

Conditions under which apprentices learn their trade have improved considerably in recent years. I.C.I. Education Officer here tells not only of the prospects for I.C.I. apprentices today, but also looks back to his own indenture days.

pleasant or unpleasant as they may have been at the time—I remain very grateful, and I would not like to underrate the influence they had on my work during the subsequent five years.

I have been asked in this article to tell you something of the present-day conditions of apprenticeship, and something about the work and prospects of the 1100 apprentices in I.C.I., bound as they are to a great variety of trades—fitter, turner, welder, electrician, instrument artificer, painter, bricklayer, sawyer, cooper, and many others.

To be apprenticed to a trade is, of course, nothing new. It is the way in which craft skills have been acquired for many centuries. Mainly, however, through the time-honoured practice of the old "Craft Gilds," apprenticeship to a trade has often assumed a significance far beyond that of instruction alone. It has naturally been used by craftsmen as one of the most effective means by which craft status can be preserved; the insistence on a specified learning period prevents the dilution of the established craftsmen by men of inadequate skill and experience. Apprenticeship has often formed the political and industrial bargaining counter in disputes of various kinds; but, in spite of all this, it can be said that the age-long, jealously guarded apprenticeship system has formed the background of the craftsmanship for which this country has been renowned for so many years.

The actual practice of indenturing—that is, the drawing up and formal signing of a legal agreement between the company, the parent or guardian, and the boy—is also a very old practice. It is amusing to refer to the record of an old indenture of the year 1291, in which the following words appear:

That this is the agreement made between John, son of Gerard le Specer of Norwich, on the one part, and Hubert, son of William di Tibenham of Gernemutha, on the other part, to wit, that the aforesaid Hubert will stand in service to the aforesaid John continuously from the Feast of Pentecost in the 19th year of the reign of King Edward, son of King Henry, until the end of six years immediately following fully completed, and shall in all things as seems necessary wholly give himself humbly, faithfully and as competently as possible to the same John in this period. And the said Hubert shall be apprentice to the said John for the whole of the said time, and shall diligently fulfil

his precepts, and his secrets firmly keep, and from the service of the said John in this period in no way shall be absent, unless by the said John it by right and reason be permitted.
(Translated from the original Latin text.)

Although the wording of indentures today reflects very naturally a considerable change in our social order, the indentures are none the less solemn and dignified documents assigning to the parties concerned a considerable measure of responsibility. The extent to which formal indentures are used in this country at the present time varies considerably, but all boys who are selected for apprenticeship in I.C.I. are required to have them, and the signing of such indentures is very often a "ceremonial occasion."

While times have changed from those in which the "master" was responsible for the moral and spiritual welfare of the apprentice—which sometimes went to the extent of defining the number of times he should attend church and what the exact length of his hair should be—there is today, particularly in I.C.I., an even greater emphasis than ever before on the character of the selection and training that the boy should receive during his apprenticeship.

Recent developments in our own Company may be summarised under the following headings:

Selection

Basic training

Opportunities for technical training

The opportunity for apprenticeship in I.C.I. is open to any boy who is approaching the age of 16, whatever form of Primary and Secondary education he may have had. He may have continued at school up to this age, or he may have left school earlier and entered the Company's service in some form of juvenile employment. Boys in the latter category who have already entered the Company's service will have been given an opportunity of continuing their education on a part-time basis and, provided they have taken advantage of it, they are not necessarily under any serious handicap as compared with others who have remained at school. An increasing number of boys who have started in some form of juvenile employment in the Company before the age of 16 are now succeeding in obtaining apprenticeships.



"THE APPRENTICES' ENFORCED TOILET. A youth who dared to array himself in finery other than befitted his craft ran the risk of being forcibly despoiled of his ribbons and adornments and being reduced to a severe simplicity of apparel."
(From *London in the Time of the Stuarts*, by Sir Walter Besant)

Picture by permission of the artist, Ralph Hedley, R.S.A., and the owner, W. F. Henderson (by courtesy of A. & C. Black Ltd.)

It has to be remembered that the primary objective of our apprenticeship scheme is to produce good craftsmen, a goal which is held in high esteem and one which can give more personal satisfaction to those whose talents lie in this field than in a great many other walks of life which are often classified as professional in character. The opportunity, however, for the boy of high academic ability to pursue a professional qualification as an engineer does exist; and for some boys with particular abilities in this direction, the five-year craft apprenticeship may prove a most valuable spring-board.

The primary objective already mentioned means, however, that outstanding academic results at school are not by any means the only criterion upon which we select our apprentices. Other qualities are sought, and this necessitates the most careful selection by the Company. Every attempt is made at the time to discover a boy's character, interests, aptitudes and abilities. Carefully devised tests are used to aid in this work, and in most cases the boy is given a variety of simple practical jobs to do in a normal workshop setting, during the completion of which a great deal of information is obtainable.

The actual methods employed in the different Divisions of the Company vary considerably. In some cases there is a preliminary trades course which takes place before final decision is taken in regard to selection. In another case, at Winnington, all boys attend a Vocational School for several months before definite recommendations are made regarding apprenticeship possibilities. In most cases the indentures will not be formally signed until the completion of a three months' probationary period. During these preliminary selection periods, the prospective apprentice may try his hand at a variety of trades and will be given simple fitting, turning, machining, welding and carpentry work to do. He will be told

something about the trades to which he might be apprenticed, and the instructor will become well acquainted with his abilities and his interests. The final selection will depend upon the observations made during this preliminary period, when the boy's own wish and the actual number of vacancies available in each trade will be taken into consideration.

Naturally, the number of apprentices indentured in each trade has to be kept in balance with the number of tradesmen employed. Sometimes it happens that the vacancies are already filled in the trade for which the boy has expressed a preference. In this case, if he has been found to possess potentialities for other trades, he will be given the choice of learning another trade within the Company, or of seeking elsewhere apprenticeship in the trade he prefers. The Company attaches a great deal of importance to initial selection and placement, and even when everything is apparently settled, it is still prepared to make changes if such seem to be essential in the interests of the boy and the Company's own requirements.

An outstanding feature of most of the Company's Apprenticeship Schemes has been the recent development of Basic Training Schools. The old-time system in which the apprentice during his first year or so ran the errands and brewed the tea has now given place to a systematic basic training under skilled instructors in a separate part of the shop, or even in a training school itself. Several schools of this character are now in existence within the Company, and those at Billingham, at Widnes in the General Chemicals Division, at Birmingham and Landore in the Metals Division, at Huddersfield in the Dyestuffs Division, and at Wilton, are designed on the most up-to-date lines and are well equipped for the purpose. These schools come under the immediate control of an Apprentice Supervisor who will have one or two instructors assisting him—men who have normally graduated in their own trades in our own workshops and who have been specially selected for their ability and interest in the instruction of young workers.

Under expert tuition and in an ideal setting, boys who have the opportunity of attending such schools will acquire certain basic skills with a surprising rapidity. The greater proportion of the curriculum in these schools is of a practical character, and this work is interspersed with talks that develop knowledge of tools and materials, and an understanding of the job that would be hard to acquire in any other way. These schools attempt even more than this. They aim to develop a corporate and competitive spirit, not only in the work of the school but also in the social and games activities. The instructional methods used aim at developing the boy's own initiative and of using each boy's abilities to the best advantage in a common endeavour. The boy with a keen interest and ability in the design of a model locomotive may lay out his design, and others

will be employed with him in the making of parts as one co-operative job. The same boys may be found the same evening in a keenly contested cricket match in which the superiority of the Turners over the Fitters may be decided by the mathematical accuracy of the scorer! In all these activities as much as possible is left to the boys themselves.

The environment and methods adopted in the schools give the boys a sound basis for the development of their trade, and help to build up from the outset a sense of pride and loyalty in the Company. It is possible to provide some basic training of this character for boys of all trades, and for some trades, such as bricklayers and sawyers, some specialisation will occur during the last few weeks of their basic training period. These boys may leave the school to continue their training in the workshops a little earlier than the fitter, turner and instrument artificer apprentices, for whom more advanced training can still be provided in the school.

However, it is usual for all apprentices who have the opportunity of attending these schools to start their training in the workshops themselves after the initial period of from six to twelve months. In Divisions where there are no Basic Training Schools the five-year period of planned training begins in the workshops. From then onwards, much will depend on the apprentice himself and the progress he makes. The Apprentice Supervisor keeps a keen eye on progress, periodically talks with the boy, and advises the shop management on his movement from one job to another. This is done so that he may complete his apprenticeship with the balanced experience that is necessary for his own particular trade.

Most boys will apply for deferment of their National Service until the termination of their apprenticeship, and this is usually granted. Such deferment has a two-fold advantage: it provides for a continuity of training throughout the five-year period, and also enables the Services ultimately to obtain young men whose trade skill will be of greater value to them.

During the whole term of apprenticeship the boy is encouraged by the Company to pursue appropriate classes at the Technical College, and daytime release is granted for this purpose. Some boys may take a technical course that will finally enable them to pursue a professional qualification, but for a large number a City and Guilds Course in their own particular trade may be considered more appropriate. These courses supplement their works training and enable the boys to obtain a Trade Certificate which can be of considerable value to them in their later years.

The Company keeps a careful record of progress in these classes and this helps in the final decisions regarding the ultimate career. A few boys who during the last few years have made outstanding progress in their college courses have been awarded Technical State Scholarships. They have thus been enabled to take up full-time courses at Universities in order to obtain an Engineering Degree. Others have shown outstanding abilities in mechanical drawing and design and have obtained positions in the drawing offices of the various Divisions. All these possibilities exist and no premature or irrevocable decision is taken when a boy first sets his course on a Trade Apprenticeship. Nevertheless, the Company looks to the scheme described above to provide the majority of its skilled craftsmen, for we believe that good selection and appropriate training will not only help to raise and maintain the necessary skill within the ranks of our own employees, but will provide for these employees careers in which they can be justly proud and satisfied.



Apprentices operate a lathe for parents on "open day" at Billingham



The Machine Shop, Apprentices' Training School, General Chemicals Division



An apprentice bending a pipe, using a template

I.C.I. NEWS

HEAD OFFICE

Mr. C. L. Davis

The many friends of Mr. C. L. Davis, who retired in December 1945, will be grieved to hear that he died, after an illness, on 26th August at the age of 66.

Cyril Davis started with the Company in 1914 in Birmingham and after serving in the Artists Rifles during the first world war became Establishment Officer to Nobel Industries Ltd. in London in 1919. From that time until his retirement he was engaged on personnel work in London. Cyril Davis was known to a large number of I.C.I. staff, and his host of friends will remember his unfailing good humour, tolerance and kindly nature.

To his widow we extend our deep sympathy in her loss.

ALKALI DIVISION

Pensioners' Garden Party

The annual pensioners' garden party was held on Saturday, 19th August, in the grounds of Winnington Hall. By a stroke of good fortune the weather was fine. Some 500 pensioners as well as members of the staff were guests of the Company.



Anona Winn writes her autograph

The pensioners were entertained by well-known stars, including Anona Winn, of "Twenty Questions" fame, and Alfred Swain, the singer. The Alkali Band played and there was a gymnastic display by the senior team. This year the usual flower show was not held.

Fifty Years' Service

Two employees, each with the handsome total of 50 years' service, have recently retired. Jack Thompson, Chargehand Fitter on the finishing machines at Lostock, retired on 17th August, having completed 50 years' service with the Company. He began work at the age of 15 years as an apprentice fitter and had been employed at Lostock up to his retirement. As a young man he was a keen Rugby football player.

Charlie Hickson started work in 1900 as an apprentice joiner and, except for a short break, had been with the firm until his retirement in June. He worked as a joiner with the Construction and Repair Department for 30 years, 6 months, and with the Maintenance Department for twelve years, which included seven years as a chargehand. His last six years were spent in the Research Department.

DYESTUFFS DIVISION

Women Victorious in Cronshaw Cup

Although it has been customary for a man to win the Cronshaw Cup for putting, there were no men left in the semi-finals when the cup was played for on the evening of 28th July. In the finals, before an audience of dismayed men and jubilant women, Miss D. Hellawell (Analytical Dept.) defeated Miss D. Chappell.

Formerly a consolation prize was awarded to the lady who remained longest in the competition, but since winner and runner-up were ladies, custom had to be set aside this year. The two defeated semi-finalists played for the best lady's prize, and this was won by Miss D. Heaton (Division Supply Dept.).

It has been suggested that next year a consolation prize should be awarded to the gentleman who lasts longest.

Artist at 70

When Mr. James Haughton, one-time process foreman, who joined Levinstein Ltd. as a process worker at Blackley in 1918, called at Hexagon House the other day he surprised his colleagues with an account of how he has spent his time since his retirement in 1936. Brisk and alert, he certainly did not look his 76 years.

On retirement he took a keen interest in bowls, founding and becoming first president of the Platt Fields Veterans'

METALS DIVISION

Scholarship for Apprentice

Ronald Arthur Humphries, a fifth-year indentured engineering apprentice working with Lightning Fasteners Ltd., is a recent recipient of a £50 travelling scholarship awarded by the Worshipful Company of Tinplate Workers.

Mr. Humphries is spending four weeks in the shipyard of Messrs. Yarrow & Co. Ltd. of Glasgow, where he will gain experience of marine engines and boilers and the auxiliary machinery connected with them. He was awarded the Ordinary National Certificate in Mechanical Engineering in 1948, with distinctions in applied mechanics and heat engines, and has recently completed the Higher National Certificate course.

Mr. A. Gorrington

After 50 years' service with the Company, Mr. A. Gorrington of Brimsdown Works said farewell to the Metals Division on 14th July.

Starting as a lad in the Ammunition Section of Eley Bros., Gray's Inn Road, in 1900, he later went to Angel Road, Edmonton, and worked in practically every department concerned with making sporting cartridges. He was transferred from Angel Road to Waltham Abbey in 1921, and gave particularly valuable service in the three London depots during the changes which followed the transfer of production to Witton in 1926.

British Association Visit to Kynoch Works

Among those responsible for handling the British Association programme at Birmingham were some Metals Division staff, who for some months had been preparing to receive a large party at Witton on 5th September.

After a tour of the works the 200 scientists were shown two displays—a collection of Metals Division products and the I.C.I. Literature Exhibition, "Service to Science and Industry," by a happy coincidence just installed for its stay at Witton.

Welcoming the visitors, Mr. H. E. Jackson, Divisional chairman, said it was always a pleasure and an advantage to all concerned when representatives of science and industry met.

The Dome of Discovery

I.C.I. have had a share in the building of the Festival of Britain Dome of Discovery. This great building will undoubtedly be one of the outstanding features of the South Bank site of the Festival of Britain and will dominate the new river front between Hungerford Bridge and the County Hall. The interior will be used to illustrate the story of British pre-eminence in discovery and exploration. The area covered by the dome will, in fact, be almost that of Trafalgar Square.

The dome itself is 365 feet in diameter, curved to a radius of 391 feet and with a perpendicular rise of 48 feet. The whole is supported on tubular steel stanchions of lattice design, each 48 feet high.

The dome structure itself is of ribbed design, utilising massive aluminium alloy composite girders, to which have been riveted aluminium-magnesium alloy cladding sheets. The main ribs are in the form of triangular composite girders, consisting of two special angles and a bottom trough channel, connected together by angle sections.



Mr. Haughton putting the finishing touches to a painting on a door in his house

Bowling Club in one of the municipal parks in Manchester. Then, on his 70th birthday, his daughter's gift of a box of paints revived interest in a hobby which he had not touched for a quarter of a century.

During the first world war he had developed a natural talent for painting and sold a considerable number of his pictures. In fact, he had furnished his home with the money he earned in this way with the furniture which he has to this day. But after his marriage he had lost interest in his hobby or, at least, he had no time to pursue it, and he put aside his brushes and palette.

All the pictures Mr. Haughton has painted during the last six years have been given away, with the exception of his last, a painting of the Manchester Corporation's reservoirs in the Longendale Valley, which has pride of place in his front room and which he is determined to keep; and two country scenes painted on the back and front panels of a door, which, he says, are a fixture.

Mr. H. E. Whittle Captains Britain

Mr. H. E. Whittle (Huddersfield Works) was chosen to captain Great Britain's team for the European athletic championships held at Brussels from 23rd to 27th August. Mr. Whittle, who has been A.A.A. 440 yards hurdles champion for the last four years and who holds the British national and English native records of 53.4 seconds, was also A.A.A. long jump champion in 1947 and 1949 and is the present decathlon champion.

Mr. Whittle was the captain of a fine team. On a total of victories won, Great Britain was the outstanding country in the championships. He himself in the 400 metres hurdles won the fourth heat in 54.3 seconds from M. Dits (Belgium) and R. Larson (Sweden), and the first semi-final in 53.1 seconds from J. Litouev (U.S.S.R.). Filippot, the Italian, won the final with a new record of 51.9 seconds, but Whittle was third with 52.7 seconds, the fastest time he has ever done. He led for two flights and was still second at the eighth flight, but hit it hard and lost ground, which he could not afford, to the Russian, Litouev, who finished second.



Piccadilly villagers playing tennis on the three-level courts built in the quarry

The Waunarlwydd Works of the Metals Division of Imperial Chemical Industries Ltd., which manufactures the 'Kynal' range of rolled and extruded products in aluminium alloys, were entrusted with the task of providing the cladding sheets for the whole of the dome and also the specially designed angles and trough channel, the latter being supplied in lengths exceeding 50 feet each. The extrusions were bent to the curvature of the dome before being sent to Structural, Mechanical and Development Engineers Ltd. of Slough, who have fabricated the girders.

NOBEL DIVISION

Tennis Courts in Disused Quarry

No one visiting the tennis courts and rock gardens at Piccadilly, a small village about four miles from Westfalite Factory, would guess that a few years ago this place was the rubbish dump of a disused quarry. Originally Mr. G. Machon, the 57-year-old factory groundsman, rented the quarry from Earl Fitzwilliam for rearing pedigree poultry. But being a keen gardener and interested in rockeries and ornamental work, Mr. Machon saw that the site of his poultry farm would make an ideal place for a tennis court and garden. So, using the sandstone already in the quarry, he levelled a piece of ground, and soon the first tennis court in Piccadilly was finished.

It proved popular, and with the help of his family and various mining friends Mr. Machon built two more courts at different levels. Meanwhile poultry-keeping was given up and

gardens were laid out in terraces, with paths and steps leading from one part to another.

The grounds are a great success with spectators as well as tennis players, and throughout the season the courts are booked for most evenings and nearly every week-end. Before Mr. Machon built the Piccadilly Courts the young people of the village had to travel long distances to play tennis.

In the quarry, which is one acre in area, there are three courts and the rest of the space is occupied by gardens. In spring the yellow broom and many rock plants make a brave show on the walls surrounding the courts, and later in the year snapdragons, pinks and roses flower along the terraces.

Bonuses for Apprentices

Engineering Department apprentices in Ardeer attended a function in Africa House on Wednesday, 9th August, when they received bonuses awarded by the Company for good work at technical classes during session 1949-50. Dr. A. C. Richardson (Works Manager) was in the chair.

After tea Dr. Richardson congratulated the students on their good work and made special mention of some outstanding performances. Two students, Mr. William Duncan and Mr. David Frew, had gained First Class Honours B.Sc. degrees in Mechanical Engineering; Mr. Jack Galbraith, another student apprentice, had completed his course for the Associateship of the Royal Technical College; while Mr. William Cunningham had been awarded the Diploma of the Royal Technical College with distinction. Two other students, Mr. William Currie and Mr. Andrew Johnston, had been awarded the Higher National

Certificate in Civil Engineering, and Mr. Edward McConnell and Mr. Matthew Hunter had gained the same qualification in Mechanical Engineering.

Awards for Safe Driving

Eight, four and three years of safe driving by three of Westquarter's lorry drivers were recognised on Tuesday, 8th August. On behalf of the Royal Society for the Prevention of Accidents, Mr. O. R. Lincham (Personnel Director) presented a third bar to Mr. D. McAdam's silver medal, and awarded certificates to Mr. T. Heeps and Mr. W. Oliver. These men, whose job it is to drive vans loaded with electric detonators and fuses, travel about 16,000 miles in a year. To do this without mishap is an achievement of which both I.C.I. and the Royal Society for the Prevention of Accidents might well be proud.

Swan Squatters at Westquarter

Great interest has been aroused in Westquarter by the arrival of a new family of swans on the canal opposite the factory. The cob of the new family is trying to drive out the pair of swans already in occupation, so that he, his mate and their seven cygnets can settle there. The two cobs spend much of their time swimming round in small circles very close to each other, and although there have been no daytime battles, rumour has it that fierce fights take place at night.

PAINTS DIVISION

I.C.I. Resins in "Old Masters" Forgery

It has been established that Van Meegeren, the Dutch painter, whose Vermeer and De Hoogh forgeries were one of the biggest post-war sensations in the art world, used phenol-formaldehyde resin instead of linseed oil when painting his now famous pictures. He used the resin because it can be treated to reproduce the numerous small cracks which are a characteristic of a linseed oil varnish that is hundreds of years old.

A scientific commission, set up by the Dutch Government to find out if this could be done, had a picture painted by an artist working as Van Meegeren had worked and using phenolic resins made by Paints Division. Thus I.C.I. resins helped to establish the Van Meegeren forgeries.

This is the story of Van Meegeren, how he worked, and how he deceived the world. One of several paintings by Vermeer and De Hoogh, the famous Dutch painters, discovered in Holland between 1937 and 1941, had been sold to Hermann Goering at a very high price during the war. When the Dutch Government started its post-war hunt for collaborationists the trail of this picture led back to an obscure Dutch artist called Van Meegeren.

He was promptly arrested, but during his trial he startled the art world by stating that the painting bought by Goering and the other seven "discoveries" were not genuine Vermeers and De Hooghs but had been painted by himself.

The scientific commission set up by the Dutch authorities discovered that Van Meegeren, contemptuous of critics who did not recognise his merit, determined to forge an old master. He chose Vermeer because he was familiar with the Dutch school and also because it was well known that some of Vermeer's works were lost.

On an old seventeenth-century canvas from which he had removed all traces of a painting by a lesser artist, and using



Van Meegeren's fake of the famous Vermeer painting, "Supper at Emmaus." The original, indistinguishable from this, was bought by the Boymans Museum, Rotterdam, for £75,000.

From Van Meegeren's Faked Vermeers and de Hooghs (Dr. P. B. Coremans). By courtesy of Cassell & Co. Ltd.

pigments similar to those used by Vermeer, Van Meegeren painted his picture, using a phenol-formaldehyde resin instead of linseed oil. Having painted the picture, he stoved it at about 100° C., then rolled it round a cylinder to produce the necessary cracks of age. He rubbed ink into the cracks to give the impression of dirt, varnished it, and signed it in the name of Vermeer. Thus, by signing the great artist's name, he became a forger. Van Meegeren amassed £600,000 by selling his paintings, his argument being that to ask a small price for his pictures would immediately bring suspicion on them.

In prison Van Meegeren was made to create another "old master" under constant supervision. During his task he learnt that the charge of collaboration had been altered to one of forgery. He was sentenced to one year's imprisonment, and died of heart failure after serving only two months of his sentence.

During the investigation, which was carried out by scientists and art experts from all over the world, a picture was painted on an old canvas and the cracks reproduced by using phenolic resins and heating to 100–120° C. as Van Meegeren had done. For these comparative tests phenolic resins of the 'Albertol' type, made by Paints Division, were used by the experts.

Controversy still rages over Van Meegeren. Some call him a genius and others a charlatan, but there is no doubt that he was one of the greatest forgers of all time.

Born on Royal Baby's Birthday

A daughter, Ruth Elizabeth, was born to Mr. S. J. Welham (Stowmarket's Export Distribution Dept.) and Mrs. Welham, on 15th August. Before her marriage Mrs. Welham, then Miss Molly Oxborrow, also used to work in the Distribution Department.

Diving Champion

Diana Groom, 16-year old daughter of Mr. E. E. Groom, of Slough Factory, won the championship for diving (open to girls of 13 to 18) at the Eastern Division Championship Meeting of the English Schools Swimming Association, held

at Great Yarmouth on 15th July. By doing so, she qualifies for the All-England Finals at Bethnal Green on 7th October. She was Suffolk Junior Champion last year, but is now over age.

PLASTICS DIVISION

Sam Rockett Swims the Channel

Sam Rockett, the Wandsworth foreman, came ashore at Shakespeare Beach at 4.50 p.m. on 22nd August, having swum the Channel in 14 hours 20 minutes. He gained fourth place for Britain in the *Daily Mail* International Channel Swimming Race and won a prize of £250.

Mr. Rockett started strongly, but after a time he began to have trouble with his goggles. Some grease on the straps was making them slip, and it was about two hours before it could be rectified. He continued, after his goggles were adjusted, to make good progress despite the choppy sea, but the water was too rough to bring the B.B.C. launch near enough for him to broadcast.

He made for St. Margaret's Bay, but unfortunately the tide turned and he was carried along parallel to the coast. He battled on grimly, and an hour and a half later, although he seemed to be tiring, he was nearing Shakespeare Cliff.

Five hundred yards from the shore the B.B.C. launch came alongside and Kenneth Best lowered himself into the water and swam along beside Sam. Tugs blew blasts on their sirens and hundreds of holidaymakers and bathers cheered as he neared the beach. Tired, but by no means exhausted, he stumbled over the slippery rocks to be greeted by his wife. He was then taken out to the B.B.C. launch to make a broadcast.

Mr. Rockett is modest about his achievement but a little disappointed that he did not make better time. Discussing the swim, he said he felt reasonably comfortable until he ran into trouble about three-quarters of a mile from the English coast.

"Owing to being slightly behind schedule," he said, "I missed the tide, and as a result I took two and a half hours to get ashore from three-quarters of a mile out. I came up against an outgoing tide, which is a contingency every Channel swimmer must conserve a certain amount of energy for. If they haven't got it, they have lost the battle. When the tide turned, I found it physically impossible to reach St. Margaret's Bay, the point for which I was making. I had to swim two and a half miles due west with the tide and come ashore at Shakespeare Beach. Because of this final struggle I was practically all-in when I landed."

Mr. Rockett had been training for his Channel swim for



Sam Rockett coming ashore at Shakespeare Beach on 22nd August after swimming the Channel in 14 hours 8 minutes



Sam Rockett receiving his £250 prize cheque

eleven months. His weekly training was done in London baths and maintained regularly although he was on shift work at Wandsworth, much of it at night. Every week-end he mounted his motor-cycle and went to Folkestone, where he trained in the sea.

He took his annual holiday a fortnight before the Channel swim. This fortnight he devoted to intensive training. The last week of his holiday was the week of the big swim. After his successful effort the Company gave him a week's holiday to recuperate.

Unlike most of the £250 prizewinners, Mr. Rockett will have some of his cheque left after he has paid his bills. He set aside £100 for training and kept his expenses within that figure. His fellow-foremen held a raffle for him which raised £40. Mr. Rockett was extremely grateful for this help, as it enabled him to undertake several long training swims which otherwise he would not have been able to afford.

Mr. Rockett, who is 31, has been a member of a swimming club since he was eight years old. He won his first important race, from Poole Bridge to Sandbanks (Dorset), when he was 15½. In 1938 he broke the Bournemouth to Boscombe Pier record, which he still holds. He has also won the Hampshire Long Distance Swimming Championship, which is decided in the Portsmouth-Isle of Wight Race.

In recent years he has concentrated on sprint swimming with a view to playing first-class water polo. His success in this may be judged by the fact that he has represented five different counties at water polo—Dorset, Hampshire, Lancashire, Hertfordshire and Middlesex B. He has also played for Wales in wartime and for the North of England.

New Canteen

The necessary expenditure for a new canteen at Black Fan Road has been sanctioned by the main I.C.I. Board and a building licence and a Board of Trade certificate have been obtained. The canteen will seat 600 and will provide both restaurant and cafeteria service. Plastic materials made by the Division will be incorporated in its construction.

The siting of the canteen is undecided, as the master plan for Welwyn Garden City has not as yet received ministerial approval. In the meantime a model is being prepared on the scale of 1 in. to 16 ft. which will give a very good idea of the

general appearance and layout of the new canteen. This model is expected to be completed in about three months' time, and it will be exhibited in the present canteen.

Fish of the Month

The £20 prize for the July Section of the 'Luron' Angling Competition was awarded to Mr. C. Inwood, Headlands, Northampton, for a fine sea trout weighing 14¾ lb. Mr. Inwood's prizewinner was caught in Fir Tree Pool, Dovey, Maclynlleth, Wales. The second prize of £5 was won by Dr. H. B. Muir, Auchtermuchty, Fife, with a 12½ lb. sea trout taken in Loch Dhughail, Loch Carron, Ross-shire.

SALT DIVISION

Champion Angler

Walter Hamlett (Engineering Dept.) can produce a bulky file of press cuttings in support of his claim to be Winsford Works' champion angler. He has been individual winner in the Greenall Whitley Shield competition, individual winner in the Northwich Local Cup competition, and the winner of the Winsford Federation Cup, which he has won for two years in succession and three times in all.

In one unforgettable season he has won no fewer than five cups, including the Northwich Rowland Cup, the Winsford Hospital Cup with medal, both the Winsford Federation Cups and the Weaver Anglers' Championship Cup. The last-named cup he has carried off six times. It is not surprising that for six successive years he has held his place in teams selected by the Northwich and District Joint Anglers' Association to compete in all-England matches. He is a member of the Queens Arms Club, Winsford, and also of the Meadow Bank Social Club's Angling Society.

His skill has been inherited by his son George (Works and Estates Dept.), who, like his father, was selected for the team of twelve chosen to represent the Northwich and District Association in the all-England match at Peterborough last month.

The "Bull's" Bellow

For most of a century the Stoke Works hooter, locally known as the "bull," has been acknowledged as the district's pre-eminent timekeeper. Even the B.B.C. pips failed to dislodge it from the affectionate position it held in the public esteem. It was more than a mere indicator of time: it signalled events of national rejoicing like coronations and royal jubilees; it roused the workers when their livelihoods were threatened by devastating fires; it gave grim warning of imminent air raids; it boomed ecstatically to mark the end of a people's travail when wars had ended.

Now that it has been replaced by an electrical buzzer, local workers miss the familiar, raucous, unmusical wail, and other people as far apart as Bromsgrove and Droitwich frequently ask, "What has happened to your 'bull'? We do miss it!"

Bowls Champions Meet

At Rudheath on 29th July, in an exhibition match arranged to provide funds for charitable purposes, Arnold Bebbington, author of our recent article "Of Woods and Greens," lost to Joe Gleave 41-24. Losing by a wide margin to Joe Gleave, Lancashire's captain, casts no reflection on Arnold's reputation, for that is a fate which many excellent bowlers have suffered.

At 64 years of age Joe Gleave, three times all-England champion and twice winner of the Lancashire Merit, is still a formidable opponent, while his immaculate style and almost supernatural concentration make him one of the most attractive exponents of the game. In a return encounter, however, the scores might easily be reversed.

A Century of Service

An association with Stoke Works which was moving towards a century ended on Friday, 11th August, when James Nicklin (Jimmy Nick) retired. Jim's father was flue-sweeper, and Jim began a lifelong association with the works when, as a very small boy, he collected, each Friday, the numbers of flues to be swept by his father during the week-end. He also helped in the actual sweeping. Jim became official sweep when his father retired. But this was only week-end work. He was not regularly employed until 1916, when he started in the sawmill.

About ten years ago a bout of pneumonia so seriously impaired his health that he was compelled to give up flue-sweeping and sawing and became a joiner's labourer. In his youth Jim was a popular player for Stoke United F.C. and Droitwich Town cricket XI. Now he is a keen grower of flowers and specialises in gladioli, hydrangeas and chrysanthemums. Before he left he was presented with a wallet subscribed for by his workmates.

Mr. Fred Smith

When he retired on 31st July after 40 years' service, Mr. Fred Smith (Division Electrical Engineer) carried with him the good wishes of his numerous friends among all sections of the Winsford Works personnel. Born in Bedford, he began his working career in his native town with Henry Bacchus Ltd., with whom he served his apprenticeship as an electrician.

He soon obtained a post with British Thomson-Houston Co., Rugby, and later accepted a position on the engineering staff of the British Westinghouse Manufacturing Co., now the Metropolitan-Vickers Electrical Co. It was from the last-named company that in 1910 he joined the Salt Union as assistant electrical engineer. In 1918 he became head of the Electrical Department, a position he held until his retirement.

I.C.I. (EXPORT)

Mr. W. B. Hughes

Mr. W. B. Hughes, local director of I.C.I. (Export) in Indonesia, retired on 31st July.

After being wounded in the 1914-18 war Mr. Hughes joined Levinstein Ltd., (subsequently British Dyestuffs Corporation (Blackley) Ltd.) in 1916. In 1921 he transferred to Brunner, Mond and Co. (China) Ltd., from which I.C.I. (China) Ltd. was formed in 1928. During the last war he was interned by the Japanese in Shanghai. At the end of 1946 he went to Java to make a survey of the potential market for I.C.I. goods, and became manager of the Indonesian branch of I.C.I. (Export) at its formation on 1st January, 1948, and local director in September of that year.

In his three years in Java Mr. Hughes saw the birth of Indonesia as an independent nation. He is now retiring to the more placid atmosphere of New Zealand.

I.C.I. (INDIA) LTD.

Bombay Recreation Club

Nearly 400 European and Indian staff and their families met at a social gathering, the first of its kind in the history of the club, held on the lawns and dance floor of the Mint Recreation Club, Bombay, on Sunday, 28th May. The function was presided over by Mr. E. W. Oakley, Director



and General Manager of I.C.I. (India) Ltd., Dyes Department, Bombay, and in the absence of the president of the club, Dr. F. S. Tomlinson, who was in England on leave, guests were welcomed by Mr. E. J. S. Ram, the vice-president.

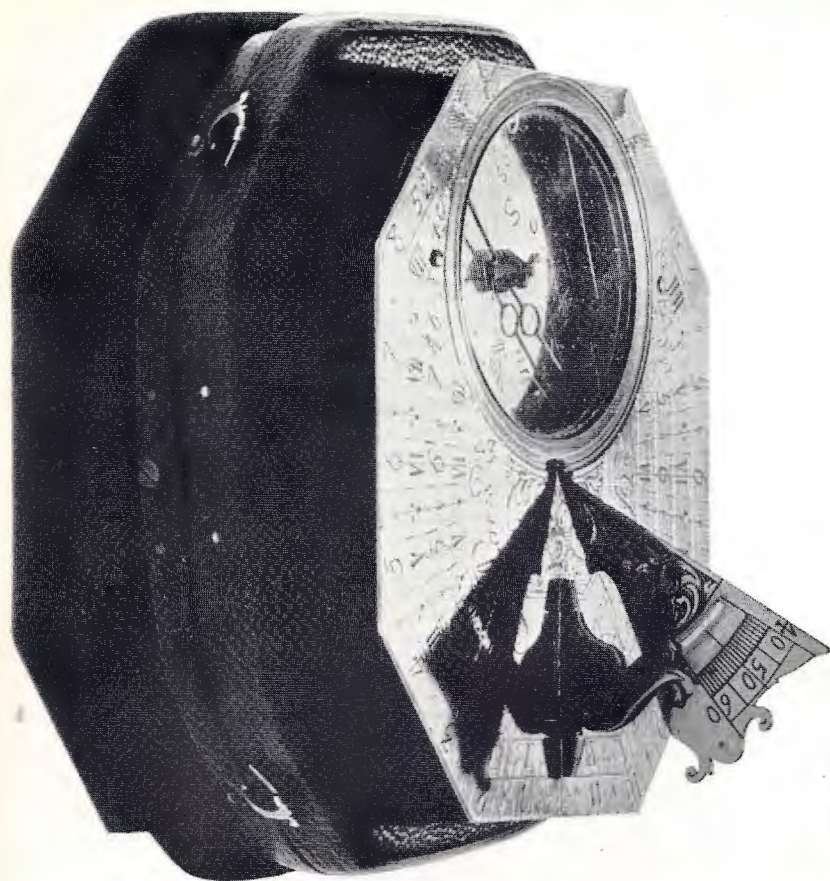
Guests were entertained to a programme which included both Indian and Western music and dancing. During the evening Mr. Oakley addressed the gathering and reminded all the members present that whatever their position in the firm might be they were all members of the I.C.I. family.

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THE NOVEMBER ISSUE

The November *Magazine* opens like its predecessor with an article by I.C.I. Education Officer, Mr. F. H. Perkins. He writes on a subject on which he is an acknowledged authority—the training of foremen under the T.W.I. scheme. Next, the series entitled "Some Glimpses into the Past" is continued with a study of the careers and personalities of some of the early alkali manufacturers from whom General Chemicals Division is directly descended. This is followed by the story in pictures of the wide and complex activities of the Alfloc Water Treatment Service.

Our two final articles strike a lighter note. The secretary of the Rugby League, Mr. William Fallowfield, discusses the provocative question "Rugby—League or Union?" in an article illustrated with photographs of the teams in the Cup Final at Wembley last year. Our last contribution is a prize-winning short story from an old friend, Mr. Robin Allen of Alkali Division.



Give me TIME

By Cedric Jagger (African Department)

Silver pocket sundial incorporating a compass, by Butterfield of Paris, a famous maker of mathematical instruments, who died in 1724. The vane or "style" folds flat on to the dial when not in use.

There is a special fascination about old clocks and watches. Not only are they beautiful in themselves, but if you are clever enough to be able to repair an old movement you have, in addition to the joy of collecting, the thrill of reviving. Old watches are not only to be bought for pounds. They can be acquired sometimes for a few shillings.

MOST people feel, at some time or other, the fascination of watches and clocks. They would perhaps like to start a collection if it were not for fear of the expense. But my own experience has always been that this hobby, like any other, costs exactly as much as you are prepared to spend on it. If you intend to collect rare pieces by famous makers, then your hobby may well cost you thousands of pounds. Conversely, there are hundreds and probably thousands of watches in "junk shops" all over the country which, although anything from one hundred and fifty to two hundred years old, are only priced in shillings.

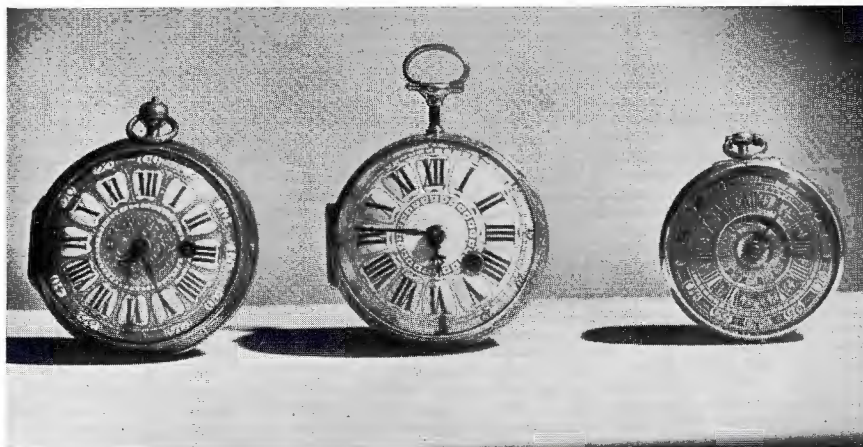
I know of a sale recently in which a complete collection of sixty-odd watches and a number of uncased movements did not fetch more than forty pounds; and I have in my possession at this moment a list of watches available at a country dealer's, the majority of which are priced at twelve shillings and sixpence, with the most expensive costing only a pound. So here is one of those hobbies which can be tailored to suit your own pocket.

A whole book could be written about the technique of "dealing with dealers." This is one of the first problems which you will meet with, if you become a horological collector. As with any other community, all types are to be found among dealers. But, strangely enough, with the exception of certain specialist dealers in London and one or two other cities, very few of those that I have come across have more than a smattering of horological knowledge, even though they may frequently trade in antique timepieces. In consequence, therefore,

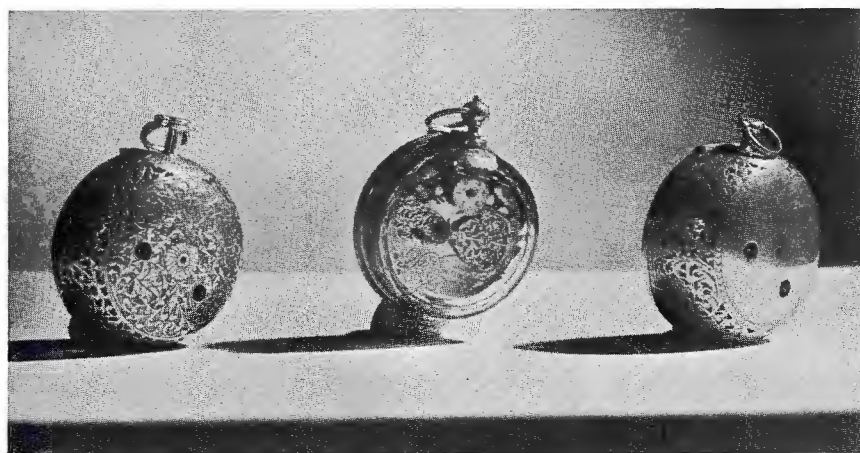
it behoves the potential collector to assimilate as much knowledge of his subject as he possibly can, both to be able to recognise a bargain instantly, and to prevent himself being overcharged for a less interesting item—for it is a common failing of dealers who are not certain of the true value of an article to assess it on the high side. My own experience has produced several flagrant examples of this and in most cases I have found that a few technical (and at the same time highly critical) remarks introduced into the discussion will usually make a difference to the final price.

The date and name of the inventor of the first mechanical clock are, unfortunately, unknown. There is no example in existence today of at least the first century of clock-making. The earliest examples we have date back to the late fourteenth century and these are all massive iron instruments which were placed on churches and other public buildings. The movement of one of these, the original Dover Castle clock, which dates back to about 1390, may be seen working to this day in the Science Museum at South Kensington.

From weight-driven public clocks slow progress was made towards domestic clocks, which were at first merely smaller replicas of the former. But with the discovery that power to drive a clock could be obtained from a coiled strip steel spring—a discovery which dates from the late fifteenth century—it was possible to reduce the size of domestic clocks to reasonable proportions and eventually to produce watches. The first watch was made about 1510 and the maker was a certain Peter Henlein, a locksmith of Nürnberg.



(Left) French watch in engraved gilt-metal case by D. Pillon of Paris—about 1720. (Centre) French quarter-repeater in pierced and engraved silver case by De Lisle of Paris—about 1720. The time on the face of the watch would be “repeated” as: five strokes—pause—then three strokes, one for each quarter. (Right) English silver alarm watch by James Swet Saint, London—date about 1685.



(Left) English clock watch by Solomon Bouquet, London, made about 1690, showing beautifully pierced and engraved inner case, typical of the “golden period” of English watchmaking. (Centre) The back of a French watch (front view on opposite page) by Duhamel of Paris. The movements and maker's signature are visible through the crystal glass case. (Right) Rear view of English alarm watch by James Swet Saint, seen in the top picture. This is another typically beautiful English case.

No one need ever be dismayed by the seeming complexity of a watch movement, for it is comparatively simple, once the basic principles have been grasped. A watch movement contains, and has always contained from the earliest days, four interdependent parts. These are the power source, a coiled spring which drives the transmitting mechanism, a “train” of toothed wheels and pinions somewhat similar to a motor car gearbox; the indicating mechanism or “hands,” which are operated by the train of wheels; and the “escapement,” a type of governor which allows the power from the spring to escape only in measured and regulated amounts through the transmission.

Very many early watches, however, had, in addition to the simple timekeeping mechanism described above, certain “attachments,” which required sometimes merely an extra wheel or wheels in the transmission, but frequently also a second spring and train of wheels. The attachments most frequently encountered are the calendar, which shows the day

of the month usually through a “window” cut in the dial, and various striking and repeating actions. The “repeater” is the forerunner of the luminous dial. It allows the owner of the watch to learn the correct time merely by pressing in the pendant on the outer case of the watch. This causes the time to be repeated to the nearest half or quarter hour by strokes on a small bell set inside the inner case of the watch. Other watches have musical attachments which play tunes at the hour, and also often repeat at will. There are also astronomical watches, which, by the use of small dials or of windows cut in a full-sized dial, show the day of the week and month, or the age and phases of the moon.

The acquiring of knowledge on horological matters is not, unfortunately, as easy as it might be. The finest books on the subject were published before the war and have been out of print for some years. Secondhand copies are comparatively rare and extremely expensive. They are, however, obtainable through the Public Libraries, either in the Reference Departments or in the Technical Section of the Lending Departments under Code Number 681. Nevertheless the reading of books is never by itself an entirely satisfactory or sufficient way of getting to know a subject. It should be combined with study of the collections in the National Museums, and also study, if possible, in the Antiquarian Section of the British Horological Institute which caters specially for collectors. This section holds meetings and lectures, arranges visits to collections, and generally aims at putting collectors in touch with each other and circulating such specialised knowledge as may be of interest.

So much for the preparation—and I would suggest most emphatically to potential collectors that they should obtain a good working knowledge on the above lines before making any attempt to form a collection. This may well save them from many pitfalls, common

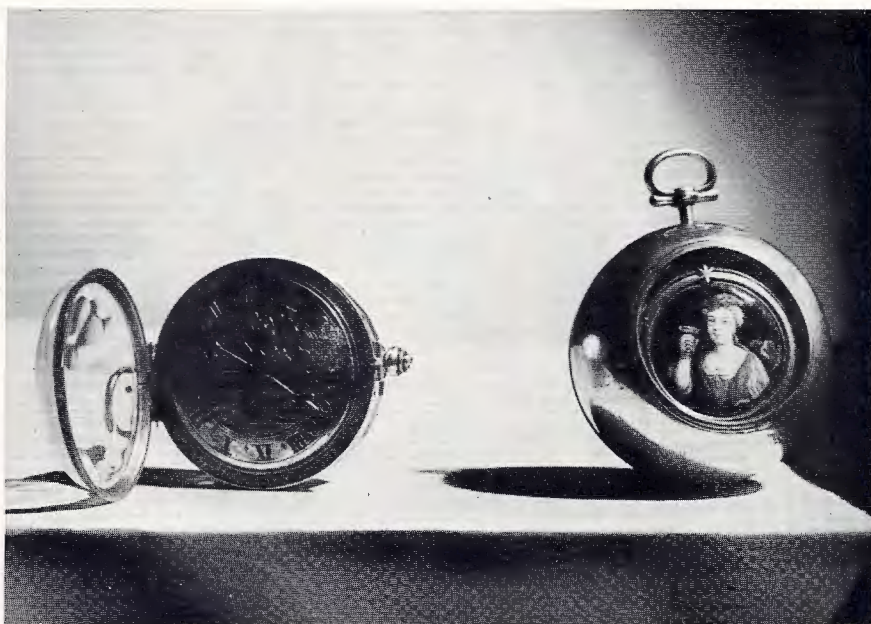
no doubt to all hobbies but perhaps especially prevalent in horology. By this I mean contemporary forgeries, fakes, and watches which have been mishandled and consequently devalued by repairers. Forgeries and fakes of the work of the famous seventeenth and eighteenth century makers are frequently come upon—and often are in themselves excellent pieces of work—but obviously they have not the value of the genuine article. In spite of this, some collectors and at least one museum devote a special part of their activities to such curiosities.

Incidentally, the vast number of contemporary forgeries still in existence pays tribute only too clearly to the tremendous esteem in which British watch and clock-making was held all over the world at that time. Names like Thomas Tompion, the “grandfather” of the industry, who is buried in Westminster Abbey with his partner George Graham; the Fromanteel family who introduced the pendulum into this country; and Daniel Quare and Edward Barlow who initiated

the "repeater"—these remain famous for their wonderful craftsmanship to this day. And there is nothing short of breathtaking genius in the life and work of John Harrison, a simple self-educated country carpenter, who never went to sea in his life, but who, nevertheless, perfected the marine chronometer, a navigational aid which added incalculable weight to British naval prestige.

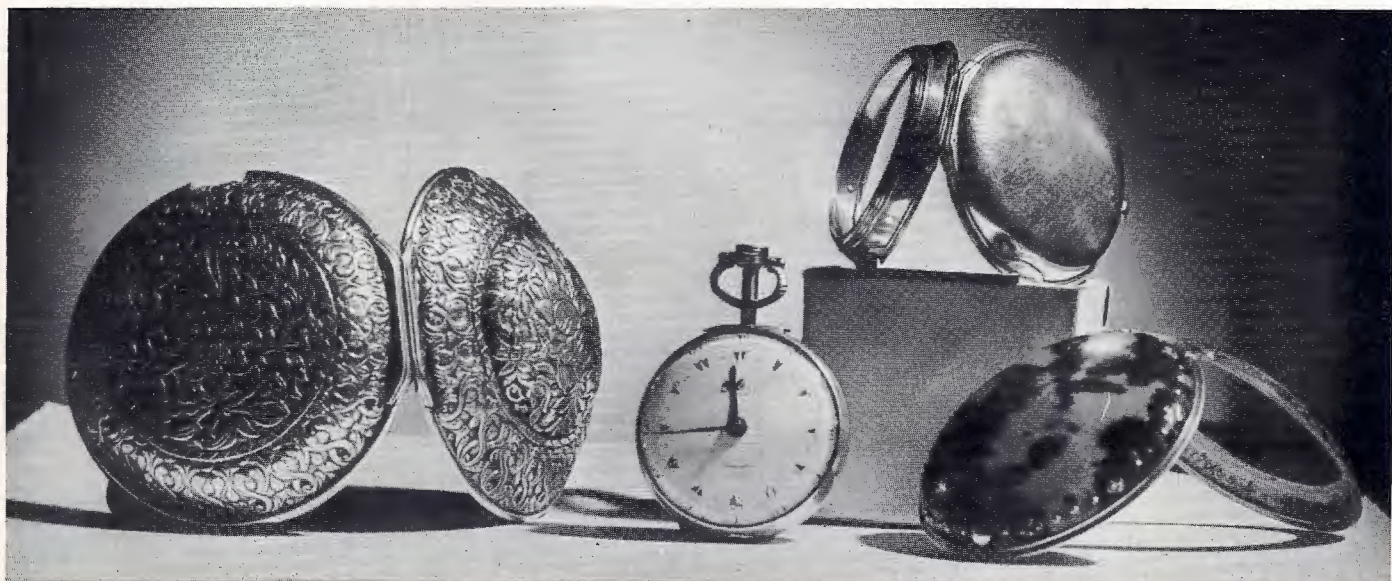
Apart from collecting complete watches, much interest can be obtained from uncased movements, which are not uncommon due to the scrapping of gold cases, and also from accessories such as winding keys and watch brackets. The early type of crank key is frequently a work of art in itself and the later types, though with less appeal to the eye, are often amusing because of the advertisements stamped on them. Watch brackets are those many and varied types of receptacles into which our ancestors placed or hung their watches for safety before retiring to bed. The most attractive of these were often made in the form of a small wooden clock-case, with a hinged lid and a cavity to receive the watch, so placed that the dial can be seen through an opening in the front.

Other pieces which make interesting collecting are watch papers, which were inserted between the outer and inner cases of watches by the original maker and by subsequent repairers to advertise themselves, and watchmakers' tokens which were given to the customer in small change and their value credited when the watch was again brought for repair. Balance cocks, the engraved and pierced metal covers enclosing the balance wheels of old watches, also make a good subject for collectors. They can usually be bought for a shilling or two, and are not uncommon owing to their vogue as decorative jewellery a few years ago.



(Left) Front view of a French watch in crystal glass case by Duhamel of Paris—about 1660. This watch has only one hand and no balance spring. (Right) Contemporary forgery of the work of the celebrated English maker, Daniel Quare, late seventeenth century, undoubtedly made on the Continent and probably French. This view of the back of the inner case shows the "port-hole," through which can be seen a miniature of a lady holding a glass of wine. The miniature conceals a balance wheel to the edge of which is attached the star seen above the lady's head. As the "balance" swings the star moves backwards and forwards round the edge of the picture.

I have tried to show that there is ample scope in horological subjects for the keen collector who is willing to spend time and wear out shoe leather in his search for specimens. What I personally love most about old watches and clocks is the way in which they strike and chime and tick today exactly as they did two or three centuries ago. No other collector's hobby gives quite the same satisfaction. It is unique because, with the repair of an old movement, to the pleasure of collecting is added the joy of reviving.



Watch with four cases, by Ralph Gout, London, designed for the Turkish market. The massive outer silver case (left) of Oriental design was probably fitted either by the distributing agent in Turkey or by the owner. The other three silver cases, the one on the right covered with tortoiseshell piqué, the one in the rear and the one containing the movement of the watch are all English, hall-marked 1803.

AMERICAN JOURNEY

By John F. Dowler (Alkali Division)

(With photographs taken by the author)

Few people have the opportunity to drive by car east to west across America. Mr. John Dowler took advantage of a break in his student's course to team up with a kindred spirit, a Finn, and drive 4000 miles in a Ford V8. He tells of "drive-in churches," of "motels" and of strange people.

NOWADAYS many people from this country seem to be touring the United States—mine-workers visiting the pits, Sunday paper journalists casting their nets wider than usual, even most of our Ministers seem to be led there in the course of their duty. All these experts relate their experiences on returning home and it is therefore with some diffidence that I put forward my own impressions.

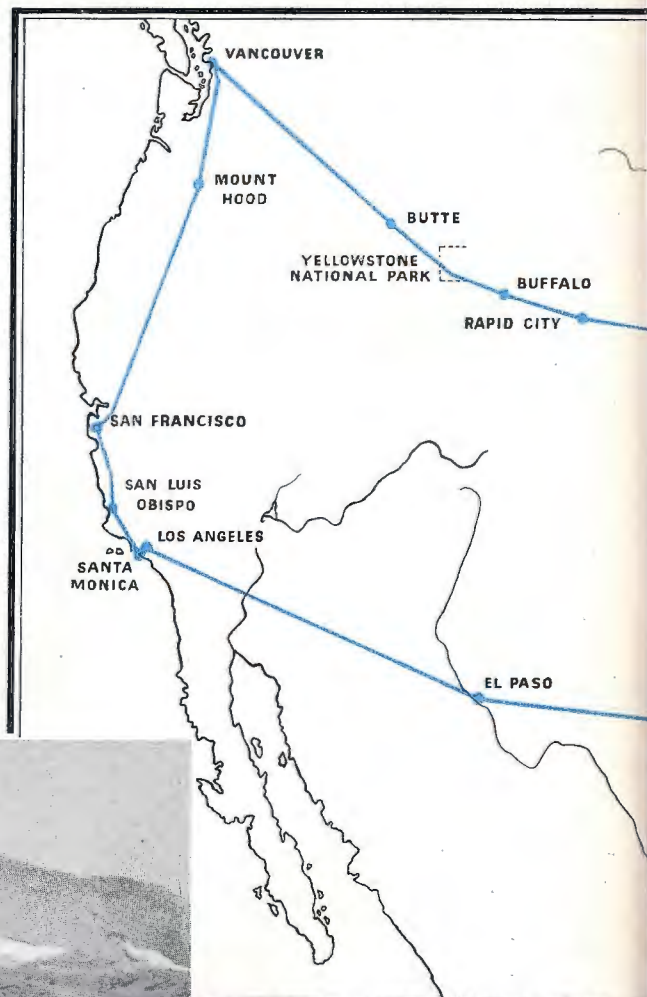
When I was sent to Boston, Massachusetts, in June 1949 as a member of an international group of engineering and chemical students, it seemed important to get a fair idea of the United States as a whole. To do this, a lot of ground had to be covered, because there are many different types of people and country in the States.

Among the group I met a kindred spirit, a Finnish consulting engineer called Bjarne Hulden, who had purchased a Ford V8. We decided to join forces and drive over to California, taking the northern route through the Rocky Mountains. Most of the New Englanders considered this a very good idea, having often thought of doing it themselves—though they had never got round to it. "Here," they said, indicating their neighbours' roofs about a quarter of a mile away, "you feel kinda hemmed in."

The first stumbling block was the driving test. We both read the American Highway Code fairly diligently on the day before the test. At the appointed hour it was shown that my knowledge was a bit scanty, and though Bjarne's was good he appeared to be blind in one eye. However, we could both drive all right, so we finally departed with our licences and the good



The car that made the journey, with Mount Hood, Oregon, 11,225 ft., in the background



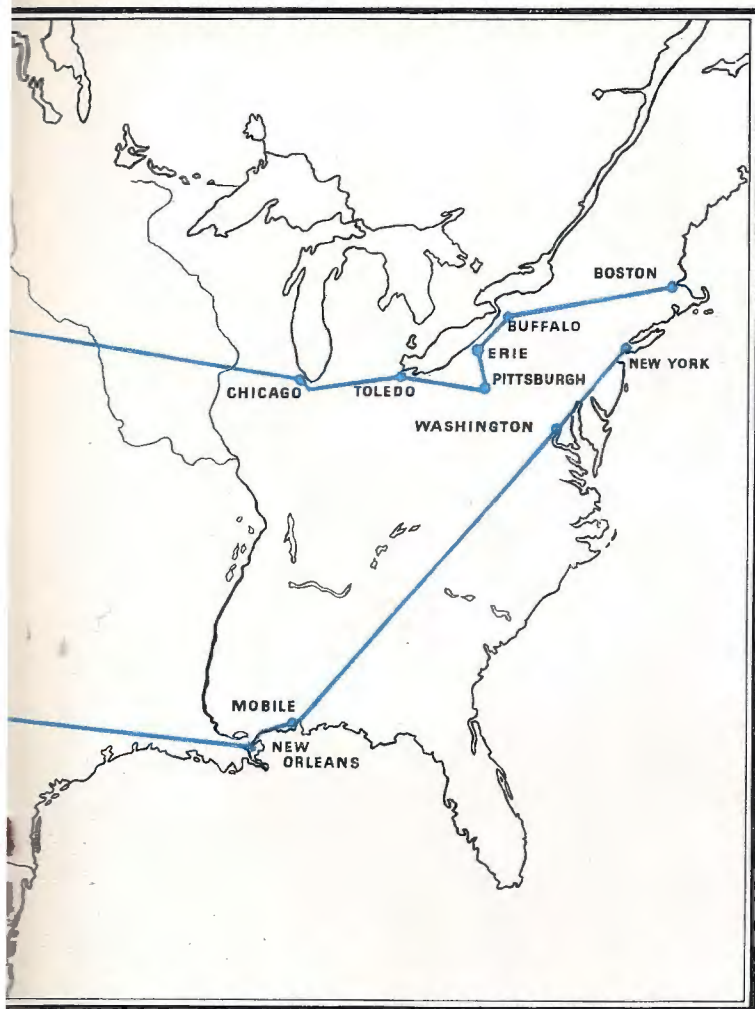
Route of the author's 6000

wishes of the examiner, who had married a German girl and so regarded us as practically his blood brothers. After a few necessary repairs we left Boston in early September, equipped

with the Ford, a couple of American Army sleeping bags and about two hundred dollars each, which owing to the currency regulations was all we could raise. In addition I had my return ticket from Los Angeles; and Bjarne, who was staying on for a while, had some more money coming in about six weeks.

So we decided to set off. The first week or two of our tour were spent in getting used to our new way of living. We found that much is done to provide the motorist with everything he needs and to catch his eye. "Drive-in" cafés and cinemas are important American institutions. The cafés serve meals to motorists while they remain sitting in their cars, and the "drive-in" cinema is a large parking place with an outdoor screen, each car being provided with a plug-in loudspeaker for sound effect. We also saw one "drive-in" church.

Highways and traffic control are well planned to cope with the enormous number of cars, but even so around the cities things often get out of hand. Once clear of the built-up area, however, it is possible to keep up a much higher speed than



—mile journey in which he travelled by car across America

in England. The roads are well surfaced and made as straight as possible, and often consist of three or four lanes.

Speed limits vary slightly from State to State, being generally between 50 and 60 miles per hour, although not much notice is taken of them. A limit of 25 miles per hour is usual in built-up areas, but in practice anyone slowing down to 40 is immediately overtaken by streams of cars and trucks. This is not so in Iowa, however, where borough engineers have cunningly concealed bumps about 200 yards inside each town boundary. These are designed so that any car travelling at more than the limit leaps suddenly into the air, wrecking the springs and the nerves of the driver. As our shock absorbers were not operating, we drove very carefully through Iowa.

West of Chicago the country is flat and uninteresting, so we crossed the area as fast as possible along straight roads where the lights of approaching cars were visible ten miles away. After about 40 hours of fairly steady driving in turns, during which we crossed the Mississippi and Missouri, I was awakened at 3 a.m. for my next spell, but pointed out with a stroke of genius that there was no sense in arriving in Rapid City at the crack of dawn. Consequently we turned the car into somebody's ranch, "Triangle Hereford," and had a rather welcome nap.

Next morning we breakfasted in the Bad Lands of South Dakota, a parched, hilly country on which nothing can live,

and then entered Rapid City where we suddenly realised that we were in the West. Men in blue jeans or full Tom Mix regalia stood around in the streets and there were quite a few Indians. Everyone seemed friendly, easygoing, suntanned, and rather bowlegged.

Beyond Rapid City a mountain road winds up into the Black Hills, tunnelling its way through the rock in places and even bridging over itself at one point. High up in the hills is the Rushmore monument, where the faces of past American Presidents are carved on a crag on the other side of a valley. In spite of the enormous size (the sculptor must have used dynamite and a pickaxe on the job) it is beautifully done. Pairs of binoculars are placed on stands at intervals, a dime in the slot enabling the visitor to view the great men more closely.

West of the Black Hills the country becomes flat for a while, but the white-capped Big Horn mountains can be seen in the distance, indicating the beginning of the Rockies. We stopped at a village called Spotted Horse, Wyoming, which was an admirable place consisting of a small farm and a pub. On entering the latter we were greeted by the only customer, a gnarled character, who asked us where we came from. When we told him he registered disbelief and stumped out, returning with his gun, with which he proceeded humorously to threaten us while repeating his question. It was a large-bore weapon, presumably for shooting grizzly bears or something, and subsequently turned out to be loaded. However he gave it up after getting the same answer and we amicably stood one another beers for a while.

It was my turn to drive and my companion immediately went to sleep. The intention was to stop for the night at Buffalo, Wyoming, at which town our route forked left. A glance at the map gave me the impression that it was 90 miles further on, but unfortunately it was only 80, so I went tearing through it and onward, amusing myself by watching antelopes and other little animals by the side of the road. After doing 40 miles too much I realised my mistake and returned to Buffalo, where we obtained a "motel" and turned in gratefully.

Motels are cabins, generally of logs, for two people. Each contains a bed or beds, cooking apparatus, shower bath and lavatory. They are dotted about the country in groups of about a dozen, and are a great boon to the motorist, being more convenient than hotels and much cheaper.

Next day we emerged rather late, and wandered happily around in the hot sun. The Big Horn mountains looked wonderful. Men stood around in groups chatting in a leisurely way which was pleasant after the bustle of the Midwest. As strangers we were greeted with friendly curiosity, but without mention of Marshall Aid, which has a way of cropping up distressingly often in the conversation of some Americans from industrial parts.

The road westwards leads up the Powder Pass, reaching 9666 feet before descending through wonderful scenery into the Ten Sleep Canyon and thence to Cody, where we celebrated the third thousand miles in our usual way and camped by a lake near the entrance to Yellowstone Park.

A man named Colter discovered this region in the middle of the last century, and came back with so many stories of steam issuing from rocks and other unlikely occurrences that he was considered a highly unreliable character for most of his life. It was discovered, however, that most of his stories were true, and the area, which has some of the finest scenery in the world, is now a National Park. It is situated high up in the Rocky Mountains, among white peaks as large and wild as the Alps.

The river drops twice the height of Niagara into a deep canyon. The authorities have been careful not to interfere with the beauty of the place, and all the buildings and signs are made from local logs.

There is a lot of wild life in the Park. Bears, which are extremely subtle creatures, have quickly discovered that shooting is not allowed, and lead a carefree life roaming through the forests by day and snuffling at the hotel rubbish bins by night. Elk and deer wander about in a much more confident fashion than usual. The Park is about 70 miles each way and there are about 3000 active geysers blowing water and steam into the air, and a number of seething mud puddles. The most famous geyser is "Old Faithful," which has been blowing water 200 feet in the air for about 4 minutes every hour since the Park was discovered.

Arrived at the gates of the Park, our car was examined for guns and we were charged three dollars for a ticket saying "Welcome to Your National Park" and warning us to keep a safe distance from bears, which it said were Dangerous Wild Animals.

Unfortunately it started to snow, and after looking at a few geysers we made our way back to the car. However, it cleared in the evening, the sun lit up the mountains and one old bear peeped at us from the wood but ran away when he heard someone coming. Though solidly built he had a wonderful turn of speed.

As it got dark we drove off to Gardiner, Montana, a village just outside the Park. Making our way into a saloon afterwards, we found ourselves in the middle of an impromptu concert. The Master of Ceremonies was an engaging personality who greeted everyone who entered by their Christian name. "Here comes Hank, let's give a clap for Hank, folks." We were soon part of the general company and numerous bottles of beer appeared in front of us from unknown sources. A quiz competition was announced, one question only, winner to get "a five dollar bill, five silver dollars or a quart of Bourbon whisky." The question was, "How high is Gardiner, Montana, above sea-level?" and as half the company immediately shouted the answer it was agreed that the best thing to do was to stand drinks all round.

Understandably, by now, we were getting interested in the gambling that was going on in one corner. From the time when gold was first struck there, Montana has had a gambling tradition, and you can always try your luck at something or other anywhere in the State. In this particular game a board, similar to the one used for Boule, was employed and one of the players threw dice when the numbers had been staked. A girl called Mary dished out counters for silver dollars which were piled up in columns at her elbow.

I swiftly lost a few dollars but Bjarne was extremely lucky and the whole company started to follow him, but when I decided to back him I found that in five minutes he had lost as much as I had.

We left the place in the small hours of the morning



A roadway sign leading to a "drive-in" church

after many fond farewells and drove back to the Park, nearly running over a coyote on the way. After throwing the seats out of the car

we sealed every crack, turned on the heater and climbed into our sleeping bags. Bjarne said something about restricting our expenditure but went to sleep in the middle.

The weather had cleared wonderfully next morning though it was still very cold. We followed an economy campaign, buying tins of beef and beans. An attempt to warm them up in the hot springs was unsuccessful but a useful technique was evolved using the car heater.

After two pleasant days we left the Park and made our way through the forests and mountains of Montana, passing through Butte, known as the "Black Heart of Montana" because of the mining industry and the rollicking attitude to life of its inhabitants. Near here, signs by the roadside offer the traveller the opportunity of panning his own gold for a mere



The Bad Lands, South Dakota, a hilly, arid desert where nothing lives

50 cents. After a few days of mountain roads winding through enormous pines and fir trees the car radio announced that our music had come "by courtesy of the Credit Dentist, John Smith of Seattle," and we knew that the Pacific was not far away.

In Vancouver we found ourselves suddenly transplanted into a British atmosphere. We bought small totem poles, of Indian manufacture, replicas of the enormous ones which leer across the harbour from Stanley Park. Bjarne bought a very nice one, of which the dealer said, "Jimmy John bumped the price up on me after that one—reckoned it put him in the artist class." He said it was difficult to get the Indians to do any carving now, as salmon fishing is very lucrative and the Indian has a rooted objection to earning money until he has spent what he's got.

We worked south, past Mt. Rainier, perpetually covered in glaciers, and camped high upon Mt. Hood, Oregon, after a cheery night eating dried salmon and drinking ale with the locals at the summit of the pass. The Ford showed signs of mutiny for the first time as we climbed on to the plateau

outside Manmee, Oregon, and was put into a little garage at Redmond for repairs.

Redmond is close to two Indian reservations, and in the first saloon we entered we were interested to see the sign "We do not serve drunkards, minors or Indians." We were told that the Indian is liable to go fifty years back amongst his ancestors with each drink, so that after two or three he lets out a screech and makes a fairly determined effort to murder the nearest white invader. The result is that saloon keepers serving them with liquor are given about six months' gaol, and the Indians present rather a melancholy picture as they wander aimlessly about the streets or slink into the cinema.

When the Ford was ready we pushed on past Crater Lake, and being now in a hurry, drove all night into California. At the State line we were stopped to see if there was any fruit aboard which might infect the Californian crop, and shortly after crossing it came across our first Redwood, standing alone by the roadside. Fifteen feet thick, rising out of sight in the dim light, it was quite the most impressive thing we had seen

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Indian-carved totem poles near Vancouver

in America. Shortly afterwards we slept for a few hours in a grove of Redwoods, and then carried on through hundreds of miles of them. We saw the Biggest Tree, the Tallest One Roomed House, and the Drive Through Tree; and more or less successfully avoided buying any of the peculiar souvenirs which Californian ingenuity has produced. There were all sorts of little articles made of Redwood, flags to hang on your wall depicting the Drive Through Tree against a yellow background, labels to stick on your car so that people would know where you'd been, and printed letters beginning "Dear —, Gee, this is really something!" which could be bought for a dime and sent to the folks at home with only the name and address to be filled in.

Looking rather disreputable, we made our way into a little pub run by a small Englishman who had been running a one-man propaganda service for the Old Country for 10 years. A battered-looking man of the woods became very friendly, asked where we came from, and after examining our appear-

ance obviously refused to believe our story. Fortunately he appeared to have left his gun at home. He said, "All right, boys, don't tell me if you don't want to. But if you're on the run, I've got a shack in the woods where you can hide up for a while. I know what it is, I've been in gaol myself." He kept reiterating his offer throughout the evening, and appeared confirmed in his disbelief of our story when we drove off for San Francisco at midnight.

San Francisco is a mature cosmopolitan city with a solid prosperity based on its position as the major port of the West Coast. The harbour, spanned by its two famous bridges, with the grim prison island of Alcatraz in the centre, ranks with Sydney as the most impressive in the world.

The American method of street planning (which consists of drawing straight lines at right angles to one another on a clean piece of paper) has its drawbacks here, as San Francisco is built on steep hills and the resulting inclines are extraordinary. In order to cope with them a special form of transport is used. Little tramcars are hauled around the town by cables under the streets, with warning bells jingling under the enthusiastic hands of their proud and happy Negro drivers.

From San Francisco a four-lane highway leads southward across dry, mountainous country to San Luis Obispo, and thence along the coast through Santa Monica, a seaside resort thronged with people escaping from L^os Angeles. A short drive along streets lined with long, thin palm trees, reminiscent of telegraph poles, takes one through Hollywood and into the city centre.

Los Angeles is interesting as a place where the American way of life has been allowed to reach its most concentrated form. It is the third city of the United States and is expanding fast as industry grows in the West. In addition to manufacturing and entertainment, Los Angeles is remarkable for its energetic and varied religions. Its cemeteries are the most luxurious and opulent in the world. The more orthodox creeds are immediately obvious to the visitor, who is frequently confronted with "Jesus Saves" in neon lights. Los Angeles has started a good many sects of its own and has more than its share of fakirs, messiahs and snake-handlers.

The Chinese quarter is typically artificial in contrast to the one at San Francisco. You might think it had been purchased complete by some enterprising person from one of the uptown studios.

I said my farewells to Bjarne and the Ford here and boarded a train for the first lap of my homeward journey.

It was early morning when 10 days later after more than 2500 miles of rail travel we arrived in New York. Sad-looking individuals were sweeping out the saloons and cafés and early risers were sleepily eating their breakfasts. New York at this time in the morning reminds me of the words on the statue of Liberty:

"Give me your tired, your poor,

The wretched refuse of your teeming shore."

Looking at any but the most fashionable quarters one feels that she was taken rather literally.

Two days later I leaned on the rail of the *Queen Mary*, as she eased out of the dock, and looked back on the things I had seen and the people I had met in the past few months. I had many pleasant memories. Though the Americans differ from us in many ways, they are a very friendly people. We should try to overcome the language difficulty and get together more often.



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Information Notes

THE I.C.I. £20,000,000 LOAN

by S. P. Chambers, C.B., C.I.E.

On 7th September it was announced that £20,000,000 4% unsecured loan stock redeemable 1958-60 was being issued by I.C.I. The whole of this issue was subscribed privately, mostly by insurance companies. In this note Mr. S. P. Chambers, C.B., C.I.E., I.C.I. Finance Director, explains something of the reasons which have made it necessary for the Company to raise more capital and how this has been done.

In the November 1949 issue of the *Magazine* I explained that, in order to maintain its productivity, industry needs capital and that, generally speaking, the more capital there is behind each worker the greater the productivity. This capital, which consists of factories, plant, motor lorries, stocks and stores, has to be paid for, and the money comes ultimately from savings out of income. This is true of all industries, whether they have been nationalised or not, and whether they are in Britain, the United States or Russia.

In this matter I.C.I. is in the same position as any other manufacturing concern. The output of its workers and its power to compete in the world's markets will depend, among other things, upon the extent to which its factories are modern and well equipped, and upon the extent to which the discoveries made by our research workers can be translated into better machines to produce our goods more cheaply or into new machines for the production of entirely new products.

The Company's programme of capital investment, which means its programme for the erection of new factories and the installation of new machinery, is a very large one. With all the research which is now going on one of the most difficult tasks is to choose which of many possible projects should be accepted and which should be postponed or rejected.

I.C.I. needs fresh capital, i.e. fresh savings to provide the money to pay for the new machines and the new factories. There are many different forms of savings which find their way in the long run into new industrial capital. One kind is the saving by the Company itself. Sums are set aside each year as reserves or as undistributed profits, and these savings provide a large part of the capital needed for the replacement of worn-out or obsolete plant and for extensions.

At the present time these reserves are not enough for all the important developments which the Company has on its programme and we have therefore looked outside the Company for other sources of new capital, i.e. for other people's savings. The possible ways of tapping these savings include (a) the issue of more Ordinary Stock to be paid for in cash, (b) the issue of more Preference Stock, also to be paid for in cash, (c) borrowing from the banks on overdraft, (d) other forms of borrowing. Two years ago about £20,000,000 was raised by issuing more Ordinary Stock, each existing Ordinary stock-

holder being offered a new £1 Share (subsequently converted into £1 Ordinary Stock) for every £5 Ordinary Stock held. The stockholder had to pay to the Company 40s. 6d. for each £1 of new Ordinary Stock, and, as about £10,000,000 stock was issued—the exact figure was £10,093,023—this meant that the stockholders paid in about £20,000,000 to the Company. Where a stockholder did not wish to take up extra stock, he was able to sell his right to do so to somebody else.

This time the Board have chosen to borrow instead of issuing more stock, and we have borrowed exactly £20,000,000 privately from a relatively small number of what are called institutional investors—by far the greater part of the total being lent by big insurance companies. The loans are repayable at the end of 1960, but the Company has the right if it chooses to redeem the whole or any part of the loan after 1957 on the payment of a small premium which cannot exceed one-half of 1% of the amount redeemed. The interest payable on the loans is 4% per annum, from which income tax is deductible.

The reasons for choosing this method of borrowing this time are technical, but it is no accident that, while I.C.I. finds that it wants money to pay for its capital extensions, the life insurance companies find themselves with money which they wish to invest.

The business of a life insurance company consists in receiving premiums on life insurance policies, investing these premiums upon the best terms it can and paying out the capital sum at death or at any other time when the policy matures. On the average the insurance company pays out in capital sums at death actually *more* than it receives as premiums, and it can do this because it has been able to invest the premiums at interest between the time of their receipt and the time when the policy matures. Paying money to insurance companies on life or endowment policies is thus one of the main ways in which people save money today. High rates of income tax make other forms of saving very difficult, and the special tax allowances for life insurance premiums make this method of saving attractive for almost all classes and almost all ranges of income.

The big life insurance companies receive very large sums week by week which they must invest in one security or another in order to earn enough interest to pay their policies on maturity. They are therefore always on the look-out for some investment where the interest is reasonably good but where there is also reasonable security. A loan to I.C.I. is just the kind of investment for which they are looking.

So it is that I.C.I.'s new loan stock comes, in the last analysis, from thousands of people who are saving money through life insurance policies. The new capital in the form

of new factories and machinery comes from savings out of the current income of all these people whose policies provide for capital sums payable on maturity which take into account the interest earned on the insurance company's investments, including the interest earned on the loan to I.C.I.

If it does not exercise its option to repay the loan before final maturity the Company will have to repay at the end of 1960, and the question of finding the money to be able to repay this large sum will arise then. Ten years is a long time ahead, and many things may happen meanwhile which will influence the decisions to be taken in connection with repayment. Both I.C.I. and the insurance companies may wish to continue the loan at the same or some other agreed rate of interest. Another possibility is that the undistributed profits of the Company may be sufficient to enable the loan to be paid off without leaving the Company short of money it wants for other purposes. Or again, it might be a good thing, either then or earlier, to make a further issue of Ordinary Stock.

However, it is idle to speculate upon decisions which will be taken when this loan is due for repayment. What is certain is that, so long as the Company continues a vigorous policy of development and expansion on sound lines, it will be able to find the money it needs for its capital programme.

REORGANISATION IN AFRICA

Contributed by African Department

Reports on the Chairman's visit to Africa have already appeared in the May and June issues of the *Magazine*. Of the major decisions taken during that visit, one which will be of particular interest to I.C.I. people is that which has resulted, in a very short time, in turning I.C.I. (South Africa) Ltd. from a small and little-known concern into one of the more important of our overseas subsidiary companies.

I.C.I. (South Africa) Ltd. was originally formed about twenty years ago with a nominal capital, primarily to supervise the commercial activities of the several I.C.I. agents in South Africa who sold ammunition, leathercloth, dyes, etc. In addition, it served the purpose of establishing and keeping alive the name of I.C.I. in that country.

As time went by, and A.E. & C.I. took over the selling agencies one by one, the status and functions of I.C.I. (South

Africa) Ltd. gradually diminished in importance until latterly its activities had almost ceased. Now, however, it is to become the I.C.I. holding company in South Africa and is at the same time to resume commercial activities on a substantially larger scale than ever before.

The circumstances which have brought about this change have their origin in the fact that when the pound was devalued in September last year the South African pound followed suit together with most of the other sterling area currencies, with the important consequence that it would once again become profitable for the gold-mining companies to work the lower-grade ores. This in turn meant a very greatly increased prospective demand for explosives, and it was immediately clear that if A.E. & C.I. were to be in a position to meet this demand the two shareholders, I.C.I. and de Beers Industrial Corporation, would have to find many millions of fresh share capital for the enlargement of A.E. & C.I. factories.

I.C.I. will be called upon to remit from the United Kingdom the greater proportion of its share of this new money, but it also intends to use such local resources as are available to it, mainly current dividends from its existing shareholding in A.E. & C.I. For technical reasons, however, this can be done more easily if I.C.I. transfers its shareholding in A.E. & C.I. to a subsidiary company registered in South Africa. This is where I.C.I. (South Africa) Ltd. comes in.

As regards commercial activities in A.E. & C.I. territory (i.e. Africa south of 15° North Latitude), I.C.I.'s freedom of action is limited by the terms of the A.E. & C.I./I.C.I. Deed of Covenant, which provides, among other things, that A.E. & C.I. shall have first option to act as I.C.I. selling agents in that area for all I.C.I. products. Having for some years past carried on the sale of almost the entire range of I.C.I. products, A.E. & C.I. have now agreed to concentrate their efforts on a more limited range; in consequence the sale of 'Alfloc' products and those of the Dyestuffs, Pharmaceuticals and Plastics Divisions, as well as a limited number of items from the other Divisions, are to be handed over to I.C.I. (South Africa) Ltd. with effect from 1st October, 1950.

This, of course, necessitates the setting up of a greatly expanded organisation, and during the last few months Mr. W. M. Inman, chairman of the Alkali Division, has been in South Africa looking into this matter, accompanied by Mr. J. M. Wollaston of the African Department.

The authorised capital of I.C.I. (South Africa) Ltd. is now £2,200,000, and its board has been reconstituted as follows:

Mr. Morgan W. J. Bull (chairman)

The Rt. Hon. Lord McGowan, K.B.E., D.C.L., LL.D.

Mr. I. Hayman, Mr. J. L. S. Steel, Mr. J. F. Voelcker.

I.C.I. DOLLAR EXPORTS

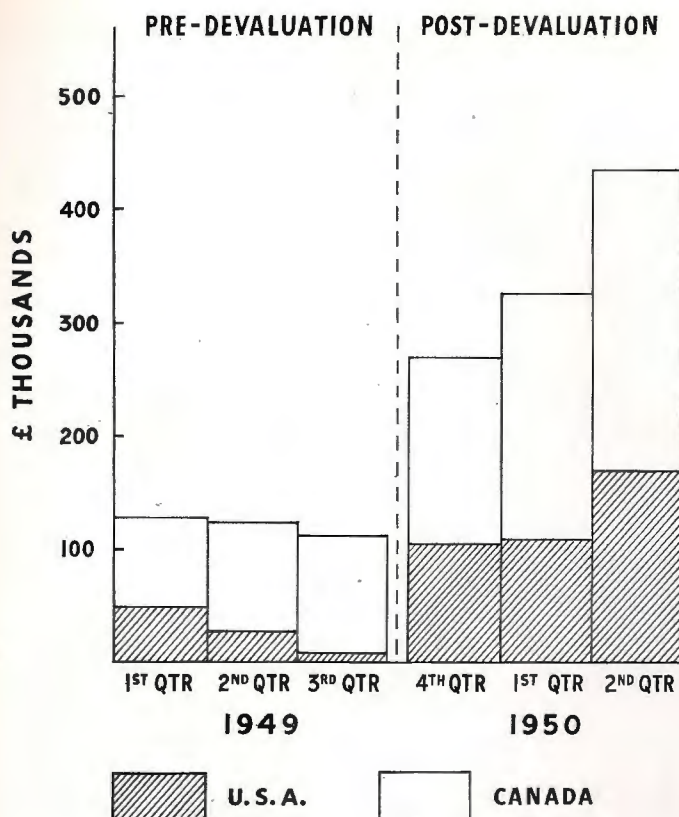
Contributed by Export Executive Department

I.C.I. exports during the first half of this year reached a record total of £22 million. This is an increase of 12% on the first half of last year, and over half the increase was to the dollar area.

The full effect of devaluation on exports to America and Canada was to some extent delayed by seasonal factors, particularly shipping on the St. Lawrence, which is closed to navigation during the winter. In the second quarter of this year there was therefore a sharp increase of 33% over the first quarter. The dollar earnings of our exports to these two markets during that quarter were \$1.25 million. Since then



A.E. & C.I. Head Office, Johannesburg



I.C.I. Exports to Canada and U.S.A. Quarterly 1949-50.

there has been a strike at the major alkali works in the U.S.A., and large shipments of alkali are being made to both U.S.A. and Canada.

It is interesting to note that in the nine months before devaluation we shipped to U.S.A. and Canada goods to the value of £365,058 and in the nine months since devaluation goods to the value of £1,032,582. In other words, we nearly trebled the sterling value of our exports. Of course, the actual dollars earned during the nine months before devaluation were at a rate of \$4.03 to the £ sterling and after devaluation at the rate of \$2.80. Nevertheless the U.S. dollar equivalent of our exports increased from \$1,471,184 to \$2,892,584, which is almost exactly double.

U.S.A. and Canada are not the only dollar countries, and I.C.I. exports have also increased substantially to the other countries in the dollar area, which are mostly situated in Central and South America. For example, shipments to Mexico have gone up from £22,000 to £233,000.

We have not achieved this very satisfactory increase in dollar exports at the expense of our traditional Empire markets. Australia, for example, took nearly £1 million more goods from us in the first half of this year compared with the first half of last year. What happened was that these exports were made at a time when our largest Commonwealth market, India, was severely restricting imports.

The efforts put in by Divisions to effect sales in the dollar markets are now bringing in substantial results. The extent to which we can take full advantage of the present situation to earn more dollars will depend on the extent to which production can be raised to a maximum and export deliveries speedily effected.

THE WHITER WASH

By K. A. Lunn (Dyestuffs Division)

All who have ever helped to turn the domestic mangle or who have watched the weekly wash being pegged out to dry are familiar with the "blue-bag" technique for giving shirt fronts and other white articles that extra bit of sparkle. It is perhaps not generally appreciated that this blueing treatment does not really confer extra cleanness or whiteness on the articles treated; it merely replaces the undesirable slight yellowness that white goods tend to acquire by a pleasant and much less noticeable bluish tint. In fact, the goods treated actually decrease slightly in brightness during the blueing process. This is because the yellow tint, in conjunction with the blue added to neutralise it, gives a slight greyness to the fabric.

Naturally, scientists have tried to find methods of countering this yellowness without the disadvantage of loss of brightness or luminosity, and recently there has been frequent reference, in the conversation of chemists and textile technologists as well as in the textile technical journals, to *whitening agents*, *white dyeing* and *optical bleaching*. What exactly do these rather puzzling terms mean?

First of all, let us try to define what we mean by *white* and *whiteness*. Any article or substance which in white light (e.g. daylight) reflects diffusely the whole of the light falling upon it, appears white to the eye. But just as it is impossible to get complete blackness, that is to say, complete absorption of light (98% is the best that can be achieved), so is it impossible to get complete whiteness or 100% reflection. We can get textile fibres like cotton and linen somewhere near complete whiteness by thoroughly bleaching the fibres, the essential object of the bleaching treatment being to remove impurities which absorb light strongly.

Attention in the search for whitening methods superior to the time-honoured blueing technique was concentrated on colourless fluorescent substances as being the most likely agents to employ. An object is said to fluoresce when it emits light as a result of absorbing other ether radiations, the emission of light ceasing the moment the exciting radiation is removed. It is not simply a question of reflection, because the exciting radiation is always different in wavelength from the light given off and may not in fact consist of visible light rays at all. In 1852 a physicist named Stokes discovered the fundamental fact that, in every case of fluorescence, the emitted light is of longer wavelength than the radiation that gives rise to it. It therefore follows that a fluorescent substance which can absorb, say, invisible ultra-violet rays and convert them into visible light in the blue-green region of the spectrum will be of possible interest as a textile whitening agent. Ultra-violet rays are present in quite large amount in the sun's rays and are also given off in varying degree by most artificial sources of light. The possible use of fluorescent substances thus opened up the prospect of getting really dazzling whites on textile fabrics, whites that would even give off more light than they received! The fluorescent substances used would, needless to say, have to be colourless themselves.

In early tests fluorescent substances derived from natural sources were needed, the principal one being aesculin, extracted from the bark of the horse-chestnut tree, but it was found that all the natural fluorescent products available washed out of the treated fabrics too easily. Moreover, exposure to sunlight tended to destroy and discolour them.



Ironing sheets in a modern laundry

Meanwhile, the chemists of the Dyestuffs Division of I.C.I. were also pioneering in this field. Their interest lay in the discovery of synthetic fluorescent compounds which might be of use as whitening agents. Many fluorescent compounds were known to them already, but few of them fulfilled the very necessary condition of being colourless. A further handicap was that no firm relationship could be discovered between molecular structure and fluorescent activity; even today only very vague similarities of structure can be discerned. In 1934 the first patent application in respect of synthetic fluorescent whitening agents was filed.

The patentees were I.C.I. and certain Dyestuffs Division research chemists. For a while development flagged, but interest was reawakened in the subject by the work of one of the leading soap firms in this country, who found that such agents could be added with very beneficial results to domestic soap powders. As a result 'Fluolite' AL was developed by the Dyestuffs Division of I.C.I. This has now been manufactured at Blackley Works for several years. It is a derivative of a chemical product called stilbene, as are most of the products useful as whitening agents for cotton, linen and cellulosic fibres. For wool, which in any case is never a chalky white colour, a bluish fluorescence is unsuitable, and compounds giving a greenish fluorescence are the best whitening agents.

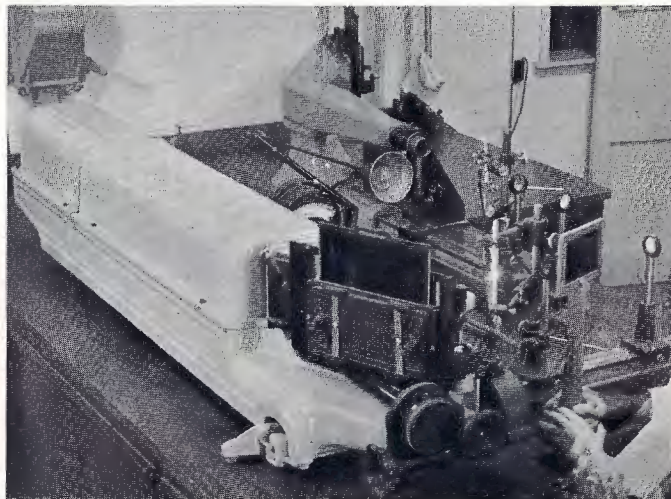
All this work has not, of course, been carried out, as certain well-known current advertisements might suggest, for the sole purpose of enabling Mrs. Jones to flaunt her super-white washing before the envious eyes of Mrs. Robinson next door. Whitening agents have found important uses in textile manufacture generally, besides being used in laundry rinses, domestic soap powder and detergents.

Meanwhile, research has continued, and it is almost certain that new and improved whitening agents will become available as experience is gained in their use, and as the properties required in such agents become more exactly defined.

SPECTROGRAPHIC ANALYSIS

Contributed by Metals Division

In the application of scientific knowledge and principles to industry, Metals Division can claim a notable contribution in the field of spectrographic analysis, on which work has been going on since 1928. Five of the Division's control laboratories now include spectrographic equipment, which is used for determining the composition of metal, more particularly for estimating the amounts of impurities and minor constituents which might have a harmful or beneficial effect on the properties of the metals or alloys containing them.



A spectrograph at Witton

The physical principles involved in this method of analysis may be described simply by referring to the small green flash which most people will have seen in an electric switch when it is turned off. This flash arises from an electric arc formed momentarily between the contacts in the switch, its typical green colour arising from the presence of copper, a small quantity of which is vaporised by the arc. Similarly, other elements emit characteristic radiations when they are subjected to an electric discharge; and these radiations may be separated and recorded by means of a spectrograph, which contains a prism and a photographic plate. To analyse a sample of metal, therefore, an electric discharge is passed to it, vaporising a representative portion of all the elements it contains. Light from the discharge is split by the prism into a spectrum and a photographic record made of this. The composition of the sample is then estimated.

More than a million estimations a year are now being made in Metals Division factories—an important contribution to controlling the composition and purity of many different products employed for a wide variety of purposes.

COMPETITION FOR RAW COTTON

Contributed by I.C.I. (Egypt) S.A.

The economy of Egypt has long depended upon the production of high-grade cotton in the fertile Nile delta. The high price which this superior cotton has always commanded has been, in the past, the means whereby demand was automatically adjusted to supply. But today the situation is complicated by the dollar shortage, and countries which used to buy their cotton from the U.S.A. are now competing for the Egyptian supply.

Under the pressure of this competition Egypt has concluded bilateral trade pacts with Eastern European countries such as Poland, Czechoslovakia, Yugoslavia, Bulgaria, Hungary and Russia. Pacts with Western European countries such as Holland, Western Germany, France and Switzerland also exist. These trade pacts, based in general on a modified barter system, form the main plank of Egyptian trade policy. The credits established overseas as a result of cotton exports are used to finance the importation of manufactured goods from the countries concerned.

From the point of view of Egypt this is a reasonable and logical method of conducting trade. In practice, however, the same commodities listed for import into Egypt against cotton exports are often included in trade pacts with various nations. In order to pay off cotton purchases and thus be in a position to order fresh supplies, industrial nations must compete fiercely against each other to sell the necessary quantity of scheduled goods in Egypt. British manufacturers thus have to enter the hurly-burly of this severe competition in order to maintain their position in the Egyptian market.

Egypt has thus attained a strong bargaining position in respect of imports of manufactured goods from cotton-consuming countries. Within the last twelve months the Egyptian market has been progressively transformed into a highly competitive affair. Prices have fallen—in some cases well below world levels—and this has created difficulties for British selling agents, who, in endeavouring to retain their hold upon this not unimportant market, find some difficulty in arousing enthusiasm among their home suppliers to offer goods at the right price at the right time.

This is most understandable from a short-term point of view, as Britain undoubtedly needs every financial contribution she can obtain from her export trade. The danger, however, lies in the fact that Egypt, which has been long established as a market for U.K. products, is now being forced to rely more and more upon other suppliers for her essential needs. With this encouragement and activated by dire necessity, Continental competitors are building up their sales organisations in Egypt.

Egypt today is indeed becoming a cockpit of economic struggle between the East and the West of Europe.



Figure 1

VARIOUS STAGES IN THE CHALKING OF A PAINT SURFACE ($\times 12,000$)
Unexposed



Figure 2

Exposed 4 hours



Figure 3

Exposed 19 hours



Figure 4

BLOOM ON A VARNISH SURFACE
($\times 10,000$)

PAINT UNDER THE MICROSCOPE

Contributed by Paints Division

Paints Division has over the past two years been engaged on research with the electron microscope—a powerful scientific instrument which, by employing a beam of electrons and magnetic fields, is capable of magnifying an object 50,000 times. At this magnification the diameter of a human hair would appear to be as big as a factory chimney.

"Chalking" and "blooming" of paint films are two problems which are being investigated with the aid of this instrument. Chalking is a term used to describe surface powdering of a paint film, usually on exterior exposure. One of the chief agents in this breakdown is the ultra-violet rays of sunlight. Figures 1-3 show the mechanism of chalking under the electron microscope. Various paints were exposed to ultra-violet light for given intervals of time and the results then observed. It was found, as the picture clearly shows, that after a short exposure undulations are formed on the paint surface. These undulations increase with the length of the exposure until pigment particles begin breaking through the paint

surface. Several interesting new theories about the mechanism of chalking have been suggested by these findings.

In the bloom investigation similarly striking results were obtained. Bloom is a phenomenon often found on varnish films. Its appearance is like a fine mist or haze over the surface. Figure 4 shows the appearance of a bloomed varnish surface under the electron microscope. The small, fern-like particles have apparently been formed by the migration of water-soluble material from the interior to the surface of the film through the influence of atmospheric moisture. By scattering the light on the surface of the paint film these particles are responsible for the phenomenon of blooming in this particular case.

Bloom, therefore, is not only a defect in the appearance of the paint film but it also indicates a special chemical and physical condition within the film which may influence adversely the water resistance and general performance of the paint film.

Some Glimpses Into

I. The Early Struggles of Brunner

By A. S. Irvine (Alkali Division)

The Alkali Division have preserved the earliest jottings and notebooks of Ludwig Mond. The inside story of some of their early troubles, not the least of age of money, and of their ideals of better work conditions, is here told in documents.

WE in I.C.I. owe a great debt to the past. It is a debt to the men who brought their genius and enterprise into a struggle to win from pure chemistry new and untried chemical processes, processes that were better suited to the inexorable demands of the ever-expanding industries of mid-Victorian Britain. The desperate nature of these early struggles is sometimes forgotten amid the stability of a great world-wide company like ours. It is not easy to visualise how intractable the difficulties were, how obdurate their solution, how small the margin between success and failure. Often we think too little upon those men—and women—whose foresight and determination are in large measure responsible for our own individual prosperity and Great Britain's lead in the chemical industry of the world today.

At Winnington in Alkali Division we are fortunate to possess not only the earliest business letters of the partners John Brunner and Ludwig Mond, but also the original notebooks, jottings and queries which preceded the enterprise there. They throw much light on the calculations which led to its conception. To browse through this mass of dusty and musty papers is like looking over the shoulders of these men as they worked to establish their process; and to understand something of their courage and tenacity.

The records of Alkali Division centre round the two founders of the firm: John Brunner, born in

Liverpool of Swiss parentage, and Ludwig Mond, the son of German-Jewish parents, who was born in Cassel in 1839 and who came to England to work at Widnes as a young man of 23. Together these two—Mond aged 34 and Brunner three years his junior—sank their all in a relatively untried process of soda manufacture. The venture nearly sank them; but finally

*Cost of a Ton of Soda Ash 56 lb made by
L. Mond's process at Widnes Solvay's process at Winnington
Capital required for a make of 60 Tons weekly.*

<u>£ 13.500</u>	<u>£ 10.000</u>
<i>Cost per Ton.</i>	
17½ cwt Pyrites @ 85 per ton £ 1-10-9	1½ cwt Sulphuric Ammonia
29 - Salt 8/6 - 12-8	at £ 20 p. ton £ 1-16-
4 - Nitrate of Soda £ 13 - 6-6	40 - Salt in Brine @ 1 -
88 - Slack 8/- 1-15-2	39 - Slack 9/11 - 13-8
35 - Limestone 6/6 - 11-4	44 - Limestone 7/4 - 8-10
Wages 1-12--	5½ - Coke (21/-) 5-9
Repairs of Plant 14--	Wages 15--
Packages 18--	Repairs of Plant 11--
General Expenses 16--	Packages 1-2--
Depreciation 10% 9--	General Expenses 8-0
Freight to Liverpool 2--	Depreciation 10% 6-8
<u>£ 9-7</u>	Freight to Liverpool 3--
<i>At Works buying Salt cake at £ 5-10 per ton the cost would be £ 10-5-</i>	<u>£ 6-10-11-</u>
<i>at the best situated works in Newcastle about £ 9-15-</i>	Royalty 8--
	<u>£ 6-18-11-</u>

An estimate in Mond's handwriting, dated May 1872, for making one ton of soda ash by the Solvay process. Compared with the old Leblanc process, it was more than £2 per ton cheaper.

the Past

r and Mond

John Brunner and
which was short-
entary quotations.

the difficulties were overcome, and the partners emerged successful, to use their wealth for the benefit of the local countryside and later science and art throughout the world.

The first letter so far discovered which indicates Mond's determination to set up a works on his own was to Walter Weldon in May 1871. Weldon had recently patented a vastly improved method of chlorine manufacture. Mond, with characteristic energy, seized on this as a way to free himself from endless consultative work and to be his own boss for once:

Having some notion of going shortly into the manufacture of Alkali and Bleaching Powder, I should feel obliged if you would inform me of the cost of plant for making 5 Tons of Bleach Powder per week by your process (including chambers and stills for the decomposition of native manganese to make up for the losses), of the actual cost of a ton of Bleaching Powder in works in this neighbourhood, and of the terms on which you would be willing to grant a licence.

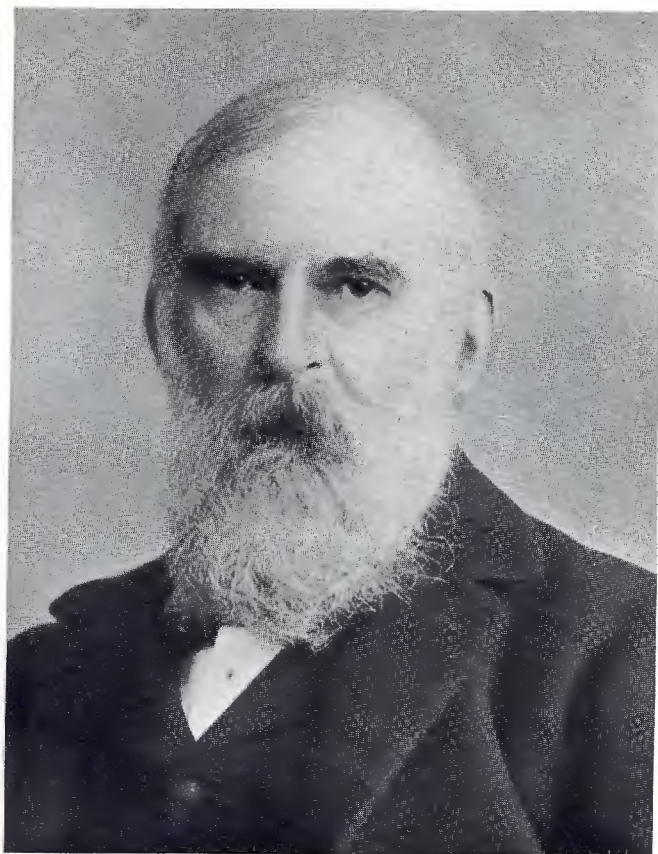
Then, about the first week in May 1872, we have an estimate in Mond's handwriting for making soda ash by the Solvay process as compared with the existing Leblanc method—the new process at £6 18s. 11d. a ton being over £2 a ton cheaper than the old. How Mond saw Ernest Solvay and came to terms with him, and how he and Brunner raised the money to buy Winnington Hall and Estate in which to live and on which to build the first Winnington Works has already been told in these pages. Some of the early struggles and adversities can be gathered from the pages of the first Winnington Copy Book.

Those in Lime Division who have to deal with complaints—even perhaps from Alkali Division—will be interested in a letter dated 4th November, 1873, to the Tideswell and Miller's Dale Coal Co.:

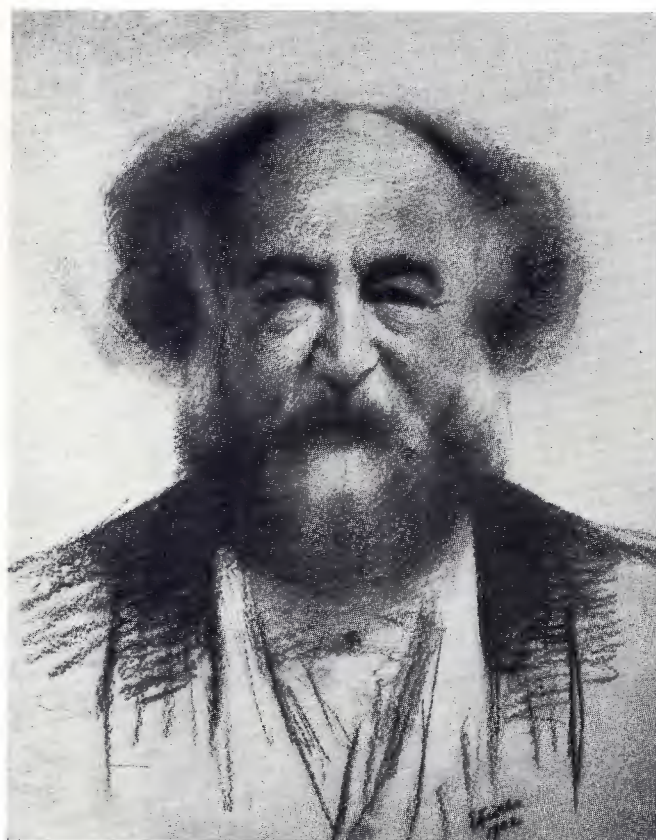
Have today received four wagons of limestone, which have not been weighed at all. We estimate the weight at 21.16 each, having measured the quantity carefully. There is too much small in them for us—(Leblanc) Alkali works would be glad of it but you know we want to burn the stone, and so small stuff is useless for us. One of the wagons is evidently from the top bed which you promised not to send as it is full of earth and roots. Don't let this happen again please.

Trouble with the Cheshire Lines Committee was added to the partners' anxieties in 1873:

We beg you will favourably consider the advisability of calling this station Winnington and not Anderton. We



John Brunner



Ludwig Mond

Statement of Cost of Estate and estimated expenditure

Price of Lord Stanley	16,108.4-
Probable law charges, including cost of mortgages	400.-
Valuations for better & by way	5.5-
Warrington	2.2-
Warrington (timber)	29.11.6
Survey & plans for Warrington	10.-
for 249 Bittins B.C. from Warrington & Co. Ltd.	64.13.-
D. 17 June	19.12.6
D. 17 June	14.9.3
D. for Lord Stanley	1.6.6
Probable loss of interest from 24 June to date of completion	75.-
	16,720.3.9
Estimated alterations & repairs to Hall & cost of fine cottages made in course of building	15.00.-
	18,220.3.9
less Timber sold	11.13.- 46.16.- 176.-
	254.9.-
	£ 17,965.14.9
Drainage &c. £12,000	
Calculation of 2,000	
Bank 3,000	
£ 17,000	
Leaving for B.C. & Co. to find way £1000	

A statement in Brunner's handwriting showing the cost of acquiring Winnington Hall and estate from Lord Stanley in 1873

and our neighbours too consider we have a right to our own name and that most of your traffic will come from us and not from Anderton.

In 1874 there was some plain speaking with Messrs. Wm. Neill & Son, an engineering firm of St. Helens, Lancashire:

Yours of yesterday asking for payment duly to hand... These engines you contracted to deliver on the 1st July last, to do certain specified work, and you have not yet, ten months behind time, put them into a condition to do the work. Yet you ask for payment, not only for the engines, but of a large sum besides, which is simply part

of the expense you have incurred in attempting to fulfil your contract.

Finally, however, things looked up and we have the following letter from John to Joseph Brunner on 7th May, 1874:

We are now turning out Ash the like of which there is not in the world. It is splendid and we are making up samples.

But the firm was not yet out of the wood, and a couple of boiler explosions (fully reported in the *Warrington Guardian*) set matters back. Added to this, the partners were in financial difficulties, to judge from the following letter from Parr's Banking Co. Ltd., Warrington, dated 13th October, 1875:

We consider that with so handsome an advance as your firm has from the Bank the private accounts of the Partners should be kept to credit or only overdrawn against satisfactory security and we shall be glad if on your return home you will be good enough to arrange accordingly.

And also this letter in 1876 from John Brunner to his partner:

I duly rec'd your telegram this morning and replied 'Banque trois cents trop, mais pense pas excessivement urgent.' [Bank three hundred too much but think not excessively urgent.] Dun would no doubt understand this and see my reason for writing in French. The Bank a/c stands to-day £9196 and I want £200 for Wages and £77 for the Railway Co. and do not expect more than £190 for a week. I have drawn on Holland* for £1000 from 1st Sept. due 4 Jany. and sent the draft to him for acceptance to-day, which will make us all right.

I have only thought of this since I wired you, and I think it well to let you know so I wire you again 'Tiré sur Charles pour mille livres' [Drawn on Charles for thousand pounds] which also you will doubtless understand and which will make you quite comfortable.

Still, though Mr. Dun of Parr's Bank (now incorporated with the Westminster Bank) could be stern when necessary, he had great faith in the partners, as can be seen from the following letter which fell in error into the hands of John Brunner. It is from Parr's Bank to the Pearson and Knowles Coal and Iron Co. Ltd. of Warrington:

* Charles Menzies Holland was a young Manchester civil engineer, son of a Liverpool merchant and a boyhood friend of John Brunner. He became a sleeping partner of Brunner, Mond and Co., putting up £5000 in early 1873. He lent the firm a further £1500 in 1874 and guaranteed a bill of exchange for an additional £6000. All but the original capital was paid off by 1876, and his investment was bought out when the limited company was formed in 1881.

of a ton of Blasting Powder
in works in this neighbour-
hood, and of the terms
on which you would be
willing to grant a licence.
An early reply will oblige
me, having delayed this
in the hope of seeing you
here. In haste

Yours very truly
Ludwig Mond.

W. Weldon Esq. ^{Esq.}
29. The Cedars
Putney S.W.

*This sample of Mond's handwriting is taken from
the letter to Walter Weldon quoted on page 315*

MESSRS BRUNNER, MOND & HOLLAND, NORTHWICH
£1500

Very respectable and industrious. Their patent is understood to be valuable. Their own Capital is small for the extent of their concern but they are well supported and £1500 is probably not too much for them in a series of transactions.

Matters gradually righted themselves and in 1875 the partners broke even. In 1876 they had paid back most of their debts and started to expand. In June of that year John Brunner went to Philadelphia in the United States to exhibit Brunner Mond soda ash at the International Exhibition there, and was successful in obtaining a bronze medal for their product. However, a rival firm of soda ash manufacturers had received an award which they apparently did not deserve. This drew a sharp letter from John Brunner to the secretary of the committee which made the award.

We respectfully ask to be allowed to enter a protest against an award being granted to the firm of Richards, Kearne and Gaspointe, of Malkins Bank, Cheshire. We are credibly informed that the goods exhibited by this firm were not made by them but by Messrs. Solvay & Cie of Couillet in Belgium, that they were not made direct from natural brine but by Messrs. Solvay et Cie's usual process. The writer, John T. Brunner, will be glad to wait upon your honorable Committee at such time as you may appoint if your honorable Committee should wish to see him.

How it all ended the archives have not, as yet, disclosed.

Two years' gruelling labour and anxiety left their mark on both the partners and John Brunner's health was seriously affected. The gay, carefree Mond of the Widnes days—the "genial host of the bachelors of the neighbourhood" and "very jovial personage" was gone. The almost superhuman trials of the early years of his business left a deep mark. Mr. Tangye, who worked under Ludwig Mond in the '80's, to this day emphasises what a fearsome and terrifying personality he was to meet: how feared he was by his co-directors, managers and staff in 1885, and yet how fundamentally kindly and benevolent his nature was, so that he was ultimately loved and appreciated by all, workmen and managers alike.

From boyhood Ludwig Mond regarded industry as affording him an opportunity to improve the lot of mankind. In 1858, when he was 19, he wrote concerning a new process he had introduced in a chemical works near Mainz:

In these circumstances I hope to do well. But what pleases me most of all is that through my quite harmless process, the previous unhealthy method which was used everywhere will be gradually obviated.

In 1872 we find his mother writing to him:

Do you remember, Ludwig, how often we spoke when you were still a student and had no practical experiences and you desired to become the ideal of a captain of industry? How you would prepare and educate workmen, and care for them that they should have a pleasant and comfortable home? What do you think now?

These ideals he never really lost sight of, and one of the reforms for which he is remembered today is the introduction of the three-shift system to replace the gruelling conditions of twelve continuous working hours.

Sir John Brunner was primarily commercial, and, while he has left perhaps more of a permanent memorial in the neighbourhood with his schools, libraries and other public works (and his forceful political opinions), Dr. Mond, who was of the works, lived on in the hearts of his workmen. That he did so—let the words of the *Northwich Chronicle*, written shortly after his death, confirm:

"... To some, it may be, the news possesses no more significance than that still another great name has been erased by the finger of death from the roll of honours-men. Theirs, however, is not the understanding. Many a veteran at the great chemical works of Messrs Brunner, Mond & Co. wiped a tear from his eye as he saw the flags. 'Th' Owd Doctor's gone then!'—and oh! what a wealth of love and affection were bound up in the words 'The old doctor,' so often heard on the lips of the men.

"They loved, they revered, Dr. Mond. Those who were favoured by Fate to work by his side during the early days speak almost with bated breath of the stress and struggle, of his wondrous endurance, his untiring patience. He exacted much, he gave more. No man outdid him in work; when a problem was in his grip he never let go until success or failure most absolute was the result. Like every other man who achieves anything, he had his failures, and was once quaintly heard to say: 'Ah! I like my failures.' With his infinite capacity to work—at times running to 24 hours at a stretch—he seemed super-human, beyond the small needs of ordinary life, transcendent, colossal. And with it all, though the burdens he sometimes imposed upon others as well as himself seemed beyond endurance, he was kindly, generous, benevolent, sensitive, never unmindful of service, never forgetting the soldier in the ranks."



Legion of De

By Dorothy Thomas (Metals Division)

Drawings by M. Aitchison

THE typewriter is leering. There it stands, its heavy feet digging defiantly into their felt carpet, the lever on the left cocking its chromium snook at me, the keys bright rims grinning derisively. I wipe my dirty fingers, collect and fling into the wastepaper basket the discarded sheets of paper and carbon, put away the screwdriver, oilcan, brushes and bottles, and creep away, cowed and despairing. The typewriter assumes an air of placid superiority.

It was new when it came to me, and, judged by the standards of its tribe, beautiful. Its matt black surface was scratchfree, its gleaming polished accessories unmarked, its intricate anatomy unsullied by eraser dust. I welcomed it gladly and consigning my faithful companion of seven years to a grateful junior, started at once to put my new servant through its paces.

At the end of two hours I had succeeded in producing three short notes. The degree of variation in their appearance was astounding. In two of them the lines of type were clamped inextricably together, in the other the space between them remained unalterably wide; the margins were erratic; the capital letters were either suspended in mid-air or absent altogether. The documents had only one characteristic in common: plentifully pocked with erasures, they all looked like the first efforts of an illiterate typing with his feet.

I tried very hard to quell the suspicion which was rising in me. I left the job alone for a couple of hours and then, calm, efficient and patient, tackled it again. I studied the Instruction Manual minutely, adjusted this and oiled that, and started off. This time it was the dollar emergency which floored me, for the machine refused absolutely to record the word "export." I tried, I am sure, fifty times; the fifty-first I left the key marked "x" poised ludicrously in the air and 'phoned for a mechanic.

The expert came, listened indulgently to my tale of woe, caressed the typewriter perfunctorily and rattled off a page of perfect typing.

And then I knew, beyond any doubt, that I had met yet another example of my personal curse—the inanimate object possessed with a devil. Heaven knows I shouldn't have been surprised. I had come across enough of them in my time, and the only wonder was that the very complicated mechanism of

a typewriter had not previously been numbered among them.

Now that I have acknowledged the fact, there is nothing I can do about it, because the thing knows it has me in its thralls. I stand condemned to years of disgraceful typing, greasy paper, crumpled carbons and recurrent nightmares about changing ribbons. The battle is on, and will continue until my strength gives out or I have a decent excuse for dodging my adversary.

There is one comfort. I need not have the slightest qualm about passing it on, because of course this particular devil will be powerless to subdue anyone else. Exactly the same thing has happened with the demon-ridden contraptions which have beaten me to my knees in the past, so I should know.

That cigarette lighter, for instance. A smart, smiling little gadget, springing instantly into service at the least touch of a smoker's thumb. I looked after it kindly, keeping it con-



The long attachments struck me as unmanageable

vils



tentedly full of petrol; its wick was trimmed and its flint renewed regularly. I lent it confidently to any number of my friends and watched the clear flame spurt eagerly, endlessly, to whole chains of cigarettes. All this applied just so long as I wasn't the smoker. But if I so much as took off the cap, the whole thing was transformed forthwith into an incompetent collection of components, united only in their policy of strict non-co-operation. I tried treating it gently, I tried rough stuff. Sometimes I used my other hand in an attempt to

fool it. But never once did I succeed in lighting my cigarette without six or a dozen failures, and all the while I had it I carried tell-tale black abrasions on both thumbs.

A near relation of the pixie in the petrol lighter was the tiny devil who lived quietly in the automatic gas lighter, emerging only when it was my turn to put on the kettle. The great snag about this contrivance was that, even when it did its job properly (as naturally it did for the rest of the family), the ignition system produced only one fleeting spark at a time. It was therefore necessary to turn on the gas before applying the lighter. The rest of my household had become accustomed to the swearing and groaning which accompanied my efforts to quell these mechanical monsters, and normally they either ignored them or grabbed the object in desperation and did the job themselves. During this period, however, they became quite anxious; by the time I had discarded the "lighter" and fetched a box of matches, the reck of gas had overflowed the scullery and penetrated the kitchen, sometimes the hall. My mother lived in constant dread of finding me stretched blue-faced on the floor, the wretched implement having won its final victory.

Of course, it is not only small gadgets like this which have crossed me. One of my most hated rivals was the vacuum cleaner. I knew even before I tried using it that it was going to be too much for me. The immense length of flex would, I knew, slide in a tangled heap to the floor as soon as I touched its neat coil. The long attachments struck me at once as unmanageable. And I was right. For a long time I struggled hard, believing that the results, if I could get any, would be worth-while. But on the day when it deliberately attacked me on the stairs and pushed me, bruised and shaken, to the bottom, I gave it up and turned with a sigh of relief to an old-fashioned brush and pan.

I know there are some people—particularly among my men friends and relations—who pretend to believe that the fault lies not in the articles themselves but in me. They shrug their shoulders patronisingly and refer to the well-known ineptitude and impatience of any woman handling any tool or any machine.

Now in my case this is just not true. With all due modesty, I think I may claim that I am not particularly clumsy—in fact I can prove that. During the war I did quite a bit of surgical nursing, not only in the wards but in the operating and casualty theatres. There I was trusted (and Sister-in-Charge was anything but indulgent) with the most precious and delicate of instruments, and never once did anything un-

toward occur, either to them or the people on whom I used them. I'm very fond of cooking, and my greatest treasure is an excessively sharp knife which horrifies everyone who sees it. I use it over and over again, safely, neatly and with the greatest possible pleasure. I'm even more fond of amateur dramatics, and in three years have learned to do a variety of back-stage work, involving every kind of tool from a heavy saw to an electric drill. Even our most sceptical stage manager has been heard to admit (grudgingly) that I am "no worse than most of the men, and better than some."

I could continue with my list of accomplishments. No watch or clock ever gives me any trouble. I can replace a fuse, change a plug or fix an adaptor without the slightest risk of electrocuting myself or in any other way causing a "short," chop wood and break up coal adequately and without ruining the implements. Like every other woman, I can handle small instruments—hair curlers, several kinds of curved and pointed scissors, sharp files and tiny tweezers—which would be useless in strong male fingers.

But, like an invisible pin in the folds of my self-esteem, there exists the knowledge that I do all these things only by courtesy of a world of small sleeping infernals. At any minute one of the inhabitants may take it into his head to wake up and make my life a misery. Up to a point, of course, I have the whip-hand. Years of experience have taught me a host of cunning tricks for getting rid of objects which thwart me. Perhaps as time goes on I shall learn to pocket my pride and give in gracefully and much sooner. Or perhaps—who knows?—white hairs may bring me the secret of exorcising these demons.

In the meantime does anyone want a typewriter, condition as new?



I can chop wood without ruining the implements



"The Pantiles," Tunbridge Wells, by A. Walker (Billingham)